An analysis of Deconcentration Tendencies and Shifting –Share Situations of ICDs: Focused on the Southern Vietnam

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Abstract In Southern Vietnam, the competition among Inland Clearance Depot (ICD) has resulted in deconcentration tendencies and shifting share situations. However, related research on Southern Vietnam ICDs in particular and ICDs in Vietnam in general has been extremely limited. Hence, In this study, empirical research is conducted on ICDs located in southern Vietnam from 2010 to 2017. The throughput volume data of ICDs is analyzed by concentration indicators, namely the concentration ratio (CR), the Herfindahl-Hirschman Index (HHI), the Gini coefficient, the Lorenz curve, and the shift share analysis (SSA). The results of adopting all the methodologies indicate that deconcentration was the mainstream trend for ICDs in Southern Vietnam during the period of 2010-2017. The findings provide insights into the process of container terminal development and have academic and managerial implications. The strengthening of the competitivenes of Vietnamese container ports and ICDs could affect the competing Southeast Asian neighbors by facilitating the port of more shipping companies.

Key Words: Southern Vietnam, Competition, Inland clearance depot (ICD), Deconcentration, Shifting share situations

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1. INTRODUCTION

Before the introduction of shipping containers, transporting goods could cost an arm and a leg, making it unprofitable to pay to ship many things halfway across the country, much less halfway around the world[1]. In the 1960s, maritime transport began a revolution thanks to the development of the standardized box known technically as the intermodal but more commonly as the shipping or freight container[2]. As a result, the role of seaports has become crucial for the freight transport system and has been shaped into a network of links and nodes facilitating the movement of cargo from the origin point to the destination[3]. For these reasons, allocating a network of inland clearance depot (ICD) or inland customs depot in a certain region has driven the development of inland locations or terminals with multimodal accesses in the form of dry ports, as the mention of the United Nations Conference on Trade and Development[4]. Playing the role of inland logistics hubs, ICDs contribute significantly to ensuring that cargoes will be delivered accurately from one point to another in an efficient manner[5]. In many studies, the authors have considered that many functions of a ICD are similar to those of a modern seaport, especially its role as one of the distributional nodal points along intermodal supply chains[6]. ICDs are diversely designated[7] calls them inland terminals, the researcher Roso refers to them as inland container depots (2005) [8], (Jarkemskis & Vasiliauskas 2007) [9], and the Economic Commission for Europe (UNECE, 2001) [10] names them inland ports. The latter agency emphasizes the primary role of an inland node as an intermodal terminal, where containers, general, and/or bulk cargo are handled and stored temporarily before being moved by various modes of transport, such as roads, railways, inland waterways, and airports.

In 2018, propelled by favorable domestic and external conditions, Vietnam concluded an impressive number since 2008 with the strongest first-quarter growth in the country’s economic growth scenario. The percentage of GDP growth was evaluated the highest during 10 fiscal years from 2008 to 2018. In particular, standing at 6.8% in 2017, real GDP broadened nearly 7.4% (y/y) during the first quarter of 2018[11]. Driven by buoyant external demand, Vietnam’s export-oriented manufacturing and agricultural sectors showed an increase of 13.6% and 4.1%, respectively. Meanwhile, robust domestic demand supported a solid service sector performance, which expanded by 6.7% [11]. While the growth uptick was driven partly by a cyclical improvement in global demand, it also reflected an underlying rise in potential growth, driven by foreign direct investment (FDI), a private-sector–led recovery in investment, and an ongoing shift of labor from agriculture into the more productive manufacturing and service sectors.

Vietnam’s external position continued to improve owing to strong trade performance and FDI inflows. Because of significant enhancement and improvement in robust manufacturing and agricultural exports outpacing import growth, Vietnam recorded a widening merchandise trade surplus in the first quarter of 2018[11]. FDI inflows also continued to surge as traditional greenfield FDI was supplemented by rising equity inflows, reflecting in part a pick–up in state–owned enterprise (SOE) divestment. Supported by strong inflows, the exchange rate was relatively stable while reserves continued to rise, reaching about US$63 billion in the first four months of 2018, more than twice the nominal level reported in December 2015 and equal to around 3.6 months of imports[11].

In the south, ports in Ho Chi Minh City are the main gateway for the region, accounting for 67% of the total throughput of all Vietnamese ports. Cai Mep–Thi Via Port (Cai Mep) is a deep–water
port located around 80 km south of Ho Chi Minh City. As mentioned before, regional seaports are well connected thanks to the combined development among several inland river ports and ICDs, which have upgraded the facilities in order to receive and handle containers at some seaports in the Mekong Delta River. According to the data collected from involved enterprises, 35% to 40% of all containers arrive at crucial seaports in the south of Vietnam through inland waterway transport. Approximately 90% of the containers being transported through Ho Chi Minh City and other terminals in the Cai Mep–Thi Vai region are carried by inland waterways from ICDs[12].

In Southern Vietnam, the competition among ICDs has resulted in deconcentration tendencies and shifting share situations. However, related research on Southern Vietnam ICDs in particular and ICDs in Vietnam in general has been extremely limited. The studies that have been published include the following: Dry ports as extensions of maritime deep-seaports: a case study of Vietnam[13]; A Multi-Criteria Approach to Dry Port Location in Developing Economies with Application to Vietnam[14]; and Public–private partnership model selection for dry port development: an application to Vietnam[15]. It can be seen that, the aforementioned researches only analyze the key role and the management or administration of dry port in logistical development strategies, almost no research that analyzes the concentration of developments for ICDs in Southern Vietnam. Hence, the aim of this research is that empirical research is conducted on ICDs located in southern Vietnam from 2010 to 2017. The throughput volume data of ICDs is analyzed by concentration indicators, namely the concentration ratio (CR), the Herfindahl–Hirschman Index (HHI), the Gini coefficient, the Lorenz curve, and the shift share analysis (SSA). The findings provide insights into the process of container terminal development and have academic and managerial implications.

2. Current situation of targeted area

2.1 A brief introduction of inland container terminals in the southern area of Vietnam

At present, there are about 10 ICDs (Fig 1) connecting to Ba Ria–Vung Tau seaports and Ho Chi Minh City, including five ICDs in the area of Ho Chi Minh City (Phuoc Long, Transimex, Tanamexco, Sotrans, and Phuc Long), three ICDs in Dong Nai (Tan Cang – Long Binh, Bien Hoa, and Tan Cang – Nhơn Trạch) and two ICDs in Bình Dương (Tan Cang – Song Thanh and Tan Van). The total area of the ICDs is about 284 ha. The scale of most ICDs is over 10 ha, the largest being Tan Cang – Long Binh port of 105 ha, with the ability to expand to 300 ha[12].

![Figure 1. Map of the ICD distribution in the southern area](source)

Source: Vietnam Logistics Report, 2017

2.2 Overview of 10 key ICDs in the Southern region of Vietnam

It is estimated that 30%–40% of containerized imports and exports shipped through Vietnam have gone through customs procedures at the ICDs. Fig 2 illustrates the fluctuation in the
throughput of ICDs during the period from 2010 to 2017. According to statistics, the throughput of ICDs followed an upward trend and the throughput rank of the top three ICDs, Phuoc Long, Tan Cang – Song Than, and Tan Cang – Nhon Trach, remained unchanged. In contrast, a low rate of throughput has always been seen in the ICDs of Bien Hoa and Tan Van. Exploitation activities at these ICDs have greatly contributed to the clearance of goods jams at seaports and helped reduce traffic congestion in Ho Chi Minh City as vehicles do not have to pass through the city center. Most of the goods are transported by waterways from the seaports, such as Cat Lai, Hiep Phuoc, and Ba Ria–Vung Tau, to ICDs and vice versa.

![Graph: Throughput of ICDs (2010–2017)](image)

Source: Vietnam Logistics Report, 2017

Fig. 2. Throughput of ICDs (2010–2017)

2.3 ICD of the Saigon Newport Corporation

Saigon Newport has a warehouse system of more than 675,000 m², including customer freight service, bonded warehouses, cool warehouses, and facilities to meet the International Maritime Dangerous Goods (IMDG) Code in accordance with international standards. The distribution center is strategically located at the ICDs of Tan Cang – Long Binh and Tan Cang – Song Than, with a designed capacity of 750,000 TEU. ICD Tan Cang – Nhon Trach in Dong Nai commenced and expanded the operational scale in April 2016. The total area of the ICD’s container yard is 40,000 m². Tan Cang – Nhon Trach has a convenient location close to the industrial zone Nhon Trach (1, 2, 3).

2.4 ICD Phuoc Long

Phuoc Long is a subsidiary company of Gemadept Corporation. This ICD is located at km 7, Hanoi Highway, and Phuoc Long subdivision, District 9 Ho Chi Minh City and has been established since 1995 with an area of 120,000 m² and mainly serving import and export goods. There are also five empty container yards in adjacent locations.

2.5 ICD Sotrans

SOTRANS is currently operated by the South Logistics Joint Stock Company. It is located at Hanoi Highway, Truong Tho Ward, Thu Duc District, Ho Chi Minh City, and officially came into operation in 2010. SOTRANS has an area of 10 ha (100,000 m²), a convenient location, a state-of-the-art technological line, and package service to ensure the complete satisfaction of transportation needs for ship owners, ports, and import-export companies.

2.6 ICD Transimex

Transimex, which started operation in 2000, is located in Thu Duc District, Ho Chi Minh City, close to the Saigon River, between the city center and Dong Nai Industrial Zone and is operated by the Transimex Corporation. Transimex started operation in 2000. This ICD services goods from major seaports such as Tan Cang and Saigon Port. Imported containers are brought to this ICD by waterway; export goods are gathered at the ICD by road and river and then transported to seaports by road.

2.7 ICD Phuc Long

Phuc Long port has a total area of 100,000 m², with 86m berth length, the cargo handling equipment including two lifting frames, modern
and efficient container equipment as well as information technological system allowing container operators optimize port operation capacity, reduce delivery time, facilitate customers. Phuć Long Port is also a modern inland waterway port in the southern area, belonging to the cluster ports complex of Truong Tho, Thu Duc district, located at the gateway of Ho Chi Minh City, close to the cluster of Industrial and Export Processing Zones to the north of Ho Chi Minh City and the Industrial Zone of Bình Duong and Dong Nai Provinces.

2.8 ICD Tanamexco

This is one of the subsidiaries of Tay Nam Import Export Trading Production Company Limited. Established on 12/12/2003, the business has been undergoing the process of developing and investing in infrastructure construction. Now, Tanamexco is designed with the full functionality of a customs clearance for import and export goods and a dedicated package service system. It has achieved the trust of 32 shipping lines and import-export customers in Ho Chi Minh City and neighboring Provinces, such as Dong Nai and Bình Duong.

2.9 ICD Biên Hòa

Biên Hòa is one of the subsidiaries of the Tin Nghia Logistics Corporation and is located in Long Bình Tan District, Biên Hòa City. The infrastructure of Biên Hòa always meets customer demand at the highest level. With a total warehouse area of 45,985 m², it is designed in accordance with modern warehouse standards, including bonded warehouses and common warehouses and features a yard system of over 30,000 m² with an area of 12,000 m² at the Ben River. Biên Hòa performs a range of diverse services: bonded warehouses, customs procedures, import-export of bonded warehouses, transportation, loading and unloading, sorting of goods, packaging, counting, inventory management, and so on.

2.10 ICD Tân Vân

Tân Vân ICD TBS is part of the business sector of the TBS group, which owns and runs diverse types of business, including fashion bags, and real estate. Occupying a strategic location in the center of the most dynamic economic region of Vietnam, Tân Vân ICD TBS has a favorable geographical position for the transshipment of goods from the center to neighboring economic areas. Tân Vân ICD TBS provides diversified and flexible logistics services and consulting innovative solutions to increase customer benefits, especially in services: inland clearance points (ICDs): warehouse leasing services: yard rental services: office services, warehousing, and container storage: warehouse management: warehouse and utility services: security control services: parking lots: and other value-added services.

3. Literature review

According to Merk and Notteboom (2015) [16], the core reason leading various ports to take stakes in inland terminals and distribution centers and merge with inland ports and facilitate part of the hinterland transportation is the better linkage to hinterlands. In the book The Geography of Transport System Fourth Edition (2017) [17]. Theo Notteboom and Jean-Paul Rodrigue suggest that the regional impact of ICDs can be classified according to three major functions:

- Satellite terminals. These are close to a port facility but located mainly at the periphery of its metropolitan area (often less than 100 km), since they mainly supply a service function to the seaport facilities.
- Freight distribution clusters (load centers). These are major intermodal facilities positioned at a midpoint in the hinterland supply chain and acting as load centers that grant access to well-defined regional markets that include production and consumption functions.

- Transshipment facilities. These link large systems of freight circulation either through the same mode (e.g., rail-to-rail) or through intermodalism (rail-to-truck or even rail). For the purpose of increasing container flows as best approached from a joint seaport and hinterland perspective, the idea of dry ports is certainly not new. The notion of these ports’ role and spatial coverage is dealt with, for example, by Heaver et al. (2000 and 2001) [18] [19], Notteboom (2002) [20], Notteboom and Winkelmans (2001) [21], Robinson (2002) [22], Van Klink, H. A. (2000) [23] and Van Klink and Van den Berg (1998) [24]. The orientation of the dry port’s cargo flow forms an additional element relevant to dry port classification. Based on the orientation of the cargo flow, a dry port might be classified as a maritime-oriented node or a land-oriented one. Formerly, a dry port could be understood as an area with a strong connection to seaports via a dedicated transport corridor. The cargo base of the latter dry port is mainly found in other inland locations. According to Roso, Woxenius, and Lumsden (2009) [25] in “The Dry Port Concept: Connecting Container Seaports with the Hinterland,” a dry port is considered advanced in case it owns a good connection to the seaport, which fits into the maritime-oriented category. Additionally, dry ports might be classified as domestic when the cargo flow does not go outside the country or internationally. During the conference “Meeting the Challenge of Supply Chain Integration,” Notteboom (2017) [26] suggested that corridor development enhances the location of logistics sites in inland ports and along the axes between seaports and inland ports. The premise for developing several logistics zones is the strong and suitable interaction between seaports and inland locations.

Over the years, many empirical studies and research methodologies have been applied to evaluate the concentration and geographical patterns of dry port systems. Notteboom and Rodrigue (2005) [27] consider port regionalization a strategic answer to newly emerging requirements for functional integration, which in some ways also include the need for material integration and thus support the case for physical distribution. That is, the node has to be re-positioned both toward the sea (foreland) and the hinterland. “Logistics integration thus requires responses and the formulation of strategies concerning inland freight circulation. The responses to these challenges go beyond the traditional perspectives centered on the port itself. Port regionalization thus represents the next stage in port development (imposed on ports by market dynamics), where efficiency is derived with higher levels of integration with inland freight distribution systems”[27]. An efficient hinterland transport system also reflects by whether the actors in the system are well-coordinated and the services are well-managed or not[28]. In terms of hinterland access, competing in overlapping hinterlands should also be considered as an incentive for dry port development. As the larger logistics providers appeared, longer vertical integration was being approached, which made neighbor seaports become competitors in the common inland market. By setting up dry ports close to the market with high connections to the gateway, those seaports will increase their positions in the hinterland competition[14]. However, the studies mentioned above focus on how to efficiently deploy the network of dry ports in order to match port connectivity and the new concept of port regionalization but have not realized the competitiveness triggered by shaping the dry
port market.

In terms of functionality, an ICD or dry port is an integral part of the goods’ transportation network, which always needs to have connection by diverse modes of transports with seaports and regional destinations. Applying the study mentioned above about the connection of a seaport to ICDs is crucial; any results obtained from research will absolutely contribute substantially to the ICD business and operation concept. Accordingly, this paper poses a number of research questions: Are ICDs in Southern Vietnam becoming more concentrated or deconcentrated and to what extent? What is the geographical pattern of container terminals? Does the establishment of new ICDs come as the result of deconcentration?

4. Empirical Analysis

Several methodologies are possible for assessing dry port competitiveness, market structure, and a strong causal relationship between concentration and competition. Hence, this paper used the CR, the HHI, the Gini coefficient, and Lorenz curves to achieve the objectives.

4.1 Concentration ratio (CR[k])

The concentration ratio measures the competition from the perspectives of the number and size distribution of firms in the industry (CR3, CR4, and CR8). The most commonly used concentration ratio is the four-firm concentration ratio[29]. However, this study used the one- and three-dry port concentration ratios, known as CR1 and CR3, which were applied to determine the degree of concentration of the top three largest dry ports in the researched system. The market is considered monopolized if the value of CR3 and CR1 are equal to 75% and 50%, respectively[30]. The formula for determining the concentration ratio is:

\[ CR_{(k)} = \sum_{i=1}^{k} Si \]  

In which:

- \( k \): is the percentage throughput market share of the ith largest dry port (i = 1, 2,...-k).

4.2 The Herfindahl–Hirschman Index (HHI)

The Hirschman-Herfindahl Index (HHI), established by Hirschman (1964) [31], is a responsive tool used to measure the size of firms in relation to an industry and is an indicator of the amount of competition among them. For the purpose of this study, it is defined as the sum of the squared values of each dry port’s market share, which is attained by comparing the throughput committed by each dry port to the total throughput. It is explained as:

\[ H = \frac{\sum_{i=1}^{n} TEU_i^2}{(\sum_{i=1}^{n} TEU_i)^2} \text{ and } \frac{1}{n} \leq H < 1 \]  

In which:

- H: is the concentration index for the system.
- n: is the number of ICDs in the system.

A maximum value of 1 can be understood as the monopolist’s market share when a particular dry port completely dominates the entire throughput. When dry ports equally share the total traffic structure within a system, the index equals its minimum value of l/n, meaning that no dominance was stated at any dry port or a perfect balance existed.

4.3 Shift–share analysis

Originally, shift–share was a standard model for regional analysis that attempted to determine how much of a region’s growth can be attributed to national economic growth trends and how much can be attributed to unique regional growth factors. However, the advantages of shift–share can be used as an effective tool to measure the development of port systems[32]. In
this study, the author applied the “share” effect and the “shift” effect to explore the actual change in volume of a specific ICD. Thus, the formula for shift-share analysis used is similar to that of Notteboom (1997) [33]:

\[
SHARE_i = \left( \frac{\sum_{i=1}^{n} TEU_i - 1}{\sum_{i=1}^{n} TEU_0} \right) \cdot TEU_0 \tag{3}
\]

\[
SHIFT_i = TEU_i - \frac{\sum_{i=1}^{n} TEU_i}{\sum_{i=1}^{n} TEU_0} \cdot TEU_0 \tag{4}
\]

\[
ABSCR_i = TEU_i - TEU_0 = SHARE_i + SHIFT_i \tag{5}
\]

In which:
- \(G\): is the share effect in TEU of dry port \(i\) for the period \(t1\)-\(t0\)
- \(SHIFT\): is the shift effect in TEU of dry port \(i\) for the period \(t1\)-\(t0\)
- \(ABS\): is the absolute growth in TEU of dry port \(i\) for the period \(t1\)-\(t0\)
- \(TEU_i\): is the throughput volume of terminal \(I\), and \(n\): is the number of dry ports.

4.4 The Lorenz curve and the Gini coefficients

The Gini index or Gini coefficient is one of the main inequality measures in economics. This index can be applied to measure the distribution of income, wealth, consumption, or any other kind (Xu, 2004) [34]; moreover, the Gini coefficient compares equally concentrated levels for ranges with different numbers of terminals[33]. The Gini coefficient is calculated by the ratio of the area between the Lorenz curve and a diagonal line of equal distribution. In terms of ICDs, the Gini coefficient can be used to estimate perfect equality and inequality with the following formula:

\[
G = \frac{n + 1}{n} - \frac{2\sum_{i=1}^{n}(n+1-i)\xi}{n\sum_{i=1}^{n}xi} \tag{6}
\]

In which:
- \(n\): is the number of ICDs.
- \(xi\): is the cumulative market share regarding the throughput of ICDs from the lowest to the highest.

The coefficient varies from 1 to 0. The market is dominated by one ICD and is fully concentrated if the value of the Gini coefficient attains 1, whereas there is no concentration if the ratio ranges to 0 and the Lorenz curve would coincide with the diagonal[35]. Hence, the coefficient of ICDs ranges from 0 (or 0%) to 1 (or 100%), with 0 representing perfect equality and 1 representing perfect inequality.

4.5 Assessing the fragmentation of ICDs in the south of Vietnam from 2010 to 2017

The data collected from the annual reports of each southern ICD were utilized to evaluate their deconcentration rate. Simultaneously, the author also obtained the data of container throughput by directly interviewing the experts, owning a wide range of knowledge and experience at a certain ICD to verify the collected figures. Afterward, the data were analyzed based on CR1, CR3, the HHI, the Gini coefficient, Lorenz curves, and SSA, respectively. These numbers are shown in the table below.

| Table 1. The highest throughput ICDs in Southern Vietnam |
|-----------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| 1st dry port | TCST | TCST | TCST | TCST | TCST | TCST | TCST | TCST |
| 2nd dry port | TCLB | PL | PL | PL | PL | PL | TCLB |
| 3rd dry port | PL | TCLB | TCNT | TCNT | TCNT | TCNT | TCNT |
| CR 1 | 0.165 | 0.153 | 0.146 | 0.164 | 0.160 | 0.168 | 0.169 | 0.175 |
| CR 3 | 0.476 | 0.439 | 0.425 | 0.448 | 0.444 | 0.467 | 0.454 | 0.470 |

\(PL(Phuoc Long); TCLB(Tan Cang – Long Bình); TCNT(Tan Cang – Nhơn Trạch); TCST(Tan Cang – Song Than)\)

Table 1 describes the fragmentation ratio of the three largest throughput ICDs in Southern Vietnam from 2010 to 2017. The results demonstrate that the largest ICDs’ market share...
in the system shows a slight decline, from 0.476 to 0.470 and demonstrate that the market share was separated more equivalently for ICD participants. Similarly, the regional ICDs show a progressive increase in competition in order to occupy a certain market share, while oligopolies and monopolies were absent during the period researched. In recent years, no new ICDs have been established, and there have been no threats. Therefore, just these ten typical ICDs are competing together in the diverse market of Southern Vietnam.

The chart reveals a sharp decrease in the HHI of ICDs in Southern Vietnam from 2010 to 2011, and the remaining years of the study show a steady growth in that of ICDs. The peak of the value of the HHI for all ICDs was 0.126 in 2010 and fluctuated between a peak of 0.121 and a bottom of 0.119 between 2012 and 2017, indicating a high deconcentration trend during the studied period.

The figure illustrates the volatile data over six years (between 2011 and 2017), which also followed an upward trend, leading the enhancement of large ICDs in order to regain market share.

In contrast to the HHI (Notteboom 1997) [33], the level of concentration or deconcentration will be clarified by the Gini coefficient, and the number of ICDs will not be involved. However, both methodologies reached the same conclusion there has been a deconcentration of ICDs in Southern Vietnam. The distribution of container traffic is more comparable in the system over the observation time.

![Fig. 3. HHI of the ICD system in Southern Vietnam, 2010–2017](image)

The similarity of the latter part of the Lorenz curves from 2015 to 2017 emphasizes the stable market share of the larger-sized ICDs. Furthermore, the area between the line of perfect equality and the line of perfect inequality was quite small between 2010 and 2017. Hence, it also proves that inequality has not been substantial and that the environment has been competitive for all participating facilities. In contrast, there is considerable fluctuation in

### Table 2. Throughput of ICDs in Southern Vietnam

<table>
<thead>
<tr>
<th>Dry port</th>
<th>2010 (TEUs)</th>
<th>2011 (TEUs)</th>
<th>2012 (TEUs)</th>
<th>2013 (TEUs)</th>
<th>2014 (TEUs)</th>
<th>2015 (TEUs)</th>
<th>2016 (TEUs)</th>
<th>2017 (TEUs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICD Phuc Long</td>
<td>320,000</td>
<td>360,000</td>
<td>378,000</td>
<td>420,000</td>
<td>460,000</td>
<td>503,500</td>
<td>530,000</td>
<td>635,000</td>
</tr>
<tr>
<td>ICD Transimex</td>
<td>64,617</td>
<td>238,597</td>
<td>253,954</td>
<td>279,365</td>
<td>316,169</td>
<td>322,952</td>
<td>367,980</td>
<td>353,724</td>
</tr>
<tr>
<td>ICD SOTRANS</td>
<td>196,874</td>
<td>240,116</td>
<td>260,879</td>
<td>265,007</td>
<td>255,600</td>
<td>280,900</td>
<td>310,200</td>
<td>325,600</td>
</tr>
<tr>
<td>ICD Phuc Long</td>
<td>220,498</td>
<td>222,302</td>
<td>292,000</td>
<td>310,202</td>
<td>325,002</td>
<td>225,440</td>
<td>235,100</td>
<td>256,710</td>
</tr>
<tr>
<td>ICD Tan Cang–Nhon Trach</td>
<td>265,000</td>
<td>290,202</td>
<td>390,020</td>
<td>410,201</td>
<td>430,900</td>
<td>456,500</td>
<td>430,560</td>
<td>465,500</td>
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<td>ICD Bien Hoa</td>
<td>36,300</td>
<td>54,020</td>
<td>56,329</td>
<td>47,200</td>
<td>80,300</td>
<td>98,202</td>
<td>112,000</td>
<td>115,029</td>
</tr>
<tr>
<td>ICD Tan Cang–Song Than</td>
<td>340,201</td>
<td>370,900</td>
<td>379,881</td>
<td>480,190</td>
<td>500,102</td>
<td>540,871</td>
<td>570,890</td>
<td>600,101</td>
</tr>
<tr>
<td>ICD Tan Namexco–TayNam</td>
<td>210,201</td>
<td>225,500</td>
<td>215,602</td>
<td>231,020</td>
<td>240,202</td>
<td>260,400</td>
<td>282,012</td>
<td>292,012</td>
</tr>
<tr>
<td>ICD TBS Tien Van</td>
<td>87,092</td>
<td>89,011</td>
<td>92,002</td>
<td>92,475</td>
<td>112,070</td>
<td>114,204</td>
<td>120,761</td>
<td>132,068</td>
</tr>
<tr>
<td>ICD Tan Cang–Long Binh</td>
<td>320,211</td>
<td>330,871</td>
<td>367,900</td>
<td>390,890</td>
<td>410,902</td>
<td>420,100</td>
<td>415,455</td>
<td>443,092</td>
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</table>
market share for the remainder of the ICDs. The traffic volume of ICDs experienced nearly twofold growth over 10 years. This might explain the deconcentration trend between 2010 and 2017, which is mainly a strengthening of the medium-sized ICDs.

and 12,042 TEU shifts to the system, although their throughput volumes illustrated an accurate increase by 191,918 TEU and 209,988 TEU, respectively. Also, Phuoc Long, with a substantial growth of 230,500, shows the highest progress in comparison with the others. Moreover, reaching a shift of 38,928 TEU from 2010 to 2017, Phuoc Long consolidated potential container traffic compared to the others during each period. In that timespan, the worst performances were observed from Tanamexco Tay Nam, Tan Van, Long Binh, and Phuc Long, with negative shift effects and growth. In contrast, Bien Hoa and Tan Cang – Nhon Trach recorded less negative performances with consecutively positive results.

5. Conclusion

The results of adopting all the methodologies indicate that deconcentration was the mainstream trend for ICDs in Southern Vietnam during the period of 2010–2017. The southern ICDs could be considered mid-range ICDs or transloading centers within three types, defined as close ICD/satellite terminals, midrange ICD/transloading centers, and distant ICD/load

Table 3. The highest throughput dry ports in Southern Vietnam

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</tr>
</thead>
<tbody>
<tr>
<td>ICD Phuoc Long</td>
<td>-15,511</td>
<td>6,497</td>
<td>31,186</td>
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These ICDs have existed for a long time without the emergence of new ICDs. Thanks to deconcentration, the competition of ICDs here became more violent and inevitable in order to gain the greatest market share.

First, the author would like to emphasize again that the ICD system in Southern Vietnam contributed dramatically to the connection, distribution, and consolidation of container distribution facilities between the two major regions of Ho Chi Minh City and Cai Mep–Thi Vai[12]. Originally, ICDs in the southern area experienced deconcentration due to the market share for the top three ICDs falling below 50%. Moreover, the value observed from the HHI score also reflected the moderate deconcentration level. The growth of ICDs always accompanies and relies on the enhancement of port and terminal systems thanks to the port regionalization concept. The concepts of intermodal logistics and distribution networks have made integration of the inland freight distribution system essential for an efficient container seaport system[36]. Inland components, such as ICDs, which exist within the seaport system, have become important in shaping the performance and competitive strategies of container seaports.

There are several advantages promoting the prosperity of the ICD business, leading to high market shares in the southern area of Vietnam. It is clear that regional ICDs and the hinterland or seaports in this area are connected by at least two modes of transport, including roads and inland waterways (White Book Logistics Vietnam, 2018). In the opinion of the beneficial cargo owners (BCOs) who use the services of the ICDs in this region, road conditions and congestion between Cai Mep and HCMC are terrible, especially at year-end (World Bank, 2013, Efficient logistics: a key to Vietnam’s competitiveness)[37]. Three-hour delays are common during the peak season. Normal transit time from port to factory is about four hours; during peak season, it is over eight hours. The inland waterway transport by barge has been undergoing progressive enhancement in Ho Chi Minh City and Cai Mep–Thi Vai (World Bank, 2013, Facilitating Trade through Competitive, Low-Carbon Transport)[38]. Providing diverse modes of transport, especially inland waterway transport with high-capacity barges (from 80 to 150 TEU), is a potential element in distributing the convenience of ICD activities in the researched area.

In southern areas, inland waterway connections between Cai Mep–Thi Vai and the various ICDs in the port’s hinterland of Ho Chi Minh City are currently provided by following companies: Saigon Newport Corporation, Transimex, Sotrans, Tanamexco, Phuoc Long and Phuc Long. Although these ICDs seem to have the same advantages thanks to high demand in transportation linking areas, some of them were unable to gain a high market share and became dominated. It can be seen that, located in the high density of inland waterways and along major highways, Tan Cang – Song Than was developed quickly (Annual Report Saigon Newport Corporation) [39]. From the very first stage, Saigon Newport Corporation, which owns the greatest number of terminals and ICDs in Vietnam, has shaped their two priorities as port operations and logistics. For this reason, the ICDs of this corporation—Tan Cang – Song Than, Tan Cang – Nhon Trach, and Tan – Cang Nhon Trach—have always claimed the highest percentage of market share during the years researched, while Tan Cang – Song Than dominated the market share for most of the period between 2010 and 2017.

Phuoc Long ICD is under the control of Gemadept Corporation, which is one the most dedicated companies specialized for logistical activities in Vietnam. Moreover, this corporation was the first logistics enterprise to offer container service in Vietnam (Annual Report
Gemadept) [40]. With the advantage of being an early enterprise on the market, Gemadept paid attention to promoting its logistics activities in shipping, logistics, and seaports. This enterprise also owns the biggest transshipment container port in the downstream of the Cai Mep–Thi Vai area. For the reasons mentioned above, the positive ranking of the second position for Phuoc Long during the period researched becomes clear. SOTRANS ICD, managed by the South Logistics Joint Stock Company, has been among the top three Vietnam logistics providers for many years (Vietnam Logistics Report, 2017) [41], while in 2020 SOTRANS was certified by HCMC Customs as the first model customs broker in Vietnam (Annual Report, SOTRANS) [42]. However, SOTRANS’s growth was quiet and slow, leading it to the fourth highest market share. The southern area is undeniably a diverse market for logistics activities in general and ICD activity in particular. Most existing ICDs can fully provide popular customer services, such as lifting on/off containers, loading/unloading containers, CFS, and bonded warehouses, and they are willing to receive and provide support to customers 24/7. Because the market share has been divided, the market has been undergoing a process of deconcentration, but its distribution has clearly taken shape around three groups of ICDs.

The first group of ICDs is Saigon Newport Corporation and Phuoc Long of Gemadept Corporation. These enterprises own full logistics systems encompassing ICDs, seaports, trucks, barges and vessels, and even state-of-the-art information technology like pure third-party logistics (3PL). For this reason, the ICD activities of these enterprises were significantly supported by other logistics activities in the chain. For example, customers combine using the transportation service, container terminal of Saigon Newport Corporation, and their ICD’s system. The next group, encompassing the ICDs of SOTRANS, Transimex, and Tanamexco–Tay Nam, is the second largest market share group during the study period. In fact, SOTRANS and Transimex not only provide business in ICDs, but they own vehicles like barges and trucks to provide further logistics activities. In particular, SOTRANS has the member company SOWATO, which owns the biggest river fleet in Vietnam, dedicated to and specialized in river transport. Similarly, Transimex also has a vessel fleet with the modest numbers of 84 and 128 TEU container vessels, but this enterprise owns many diverse types of trucks providing road transportation to every address, fully satisfying the customers’ transportation demands (Annual Report Transimex) [43]. The last group of ICDs basically carry out dry port activities without any other additional logistics activities support. Hence, this group often occupies the smallest percentage of market share in terms of ICD throughput TEU. It can be concluded that, in a diverse market like the Southern Area, those companies that own capital-intensive resources relating to logistics activities win and dominate the market share. The goods value chain involves many logistics activities, and a trend of mergers and acquisitions exists between shipping lines and logistics enterprises or seaports as certain parties attempt to consolidate their domination of the market.

REFERENCES


[34] K. Xu. (2004). How has the literature on Gini’s index evolved in the past 80 years? Economics working paper. Canada: Dalhousie University

Policy. Prentice Harlow.


