HOLLAND'S GOLDEN CLUSTER:

THE STORY OF THE UNITED EAST INDIA COMPANY

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Abstract

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Clusters

Since the publication of Michael Porter's "Competitive Advantage of Nations" (Porter, 1990), the notion of 'clusters' has played a role in discussions of industrial policy. The notion indicates that one should not focus on individual firms or industries, but on patterns of different economic activities and conditions that create a dynamic by mutually challenging, supporting and complementing each other. Porter also uses the notion of the 'diamond': a match between factor conditions (availability of production factors such as appropriately trained labor, infrastructure), demand conditions (advanced, demanding customers), related and supporting industries (suppliers, complementarities in production, services), and appropriate firm structure, strategy and competition.

The idea for this article is the following: If the notion of clusters and

diamonds is worth its salt, it should materialize in the analysis of any case of striking success in economic development. For such a case we turn to the foundations of Holland's success in its "golden age" of the 17th century, in the build-up of the global commercial empire of the United East India Company (VOC). Preceded by the Portuguese and succeeded by the British, the Dutch dominated world trade in east and west. While generally in Europe the 17th century was a disastrous age, in Holland it yielded high prosperity, and an unprecedented level of urbanization.

The fact that this was based on trade and merchant-entrepreneurs belies the popular view on economic history that capitalism, prosperity, urbanization, schooling and the fundaments of modern society required industrial development, which started in Europe around 1800. The much earlier trade-based prosperity and urbanization were not restricted to Holland's golden age: they appeared also in earlier civilizations, such as those of Arabs and Venetians. But the distinctive feature of the Dutch case was that trade was turned into a capitalist venture, by a bourgeois class of merchant-entrepreneurs who invented the capitalist institution of a company with limited liability, and the spread of risk across many holders of shares, which were traded on a share market.

From what combination of factors did the Dutch expansion across the world emerge? Can we detect a cluster here? We will consider the build-up towards Dutch success, in the 15th and 16th century; the take-off and subsequent consolidation the VOC in the first half of the 17th century, and the subsequent decline.

A triangle of trade

The story of the emergence of Holland as a world power will confirm everybody's pet stereotypes of Holland: herrings, harbors, windmills and canals. It all began with herrings. They are still part of the Dutch scene, as anyone who visited the Netherlands will have witnessed: you throw back your head and let the salted, raw herring slide into your mouth, to nibble it off its tail. Delightful to some and disgusting to others.

For some reason, in the 15th century the herring moved its spawning grounds from the Baltic to the North Sea. This provided a window of opportunity to the Dutch, in the form of a good to be traded in the Baltic, in return for lumber and wheat, which could be traded for wine, spices and salt along the Iberian peninsula (Spain and Portugal). This opportunity could not be realized until the Dutch invented a method for disembowelling the herring and preserving it with salt. The salt needed for this process needed to be gotten from the Iberian peninsula. An obstacle was that goods could reach the Baltic only through the hands of the Hanseatic trade cartel. The Dutch could sell their goods in Hamburg, from where the Hanse cities took over, and pocketed the profits, by transporting the goods over land to the shore of the Baltic, "on the other side" of the Jutland peninsula. The Dutch bypassed this by taking the huge detour around the peninsula, through the Sont straights. The greatly increased cost was contained by an innovation in ship design: the flute. It had a bulging, bulbous hull, yielding a higher ratio of cargo to crew. Also, toll in the Sont was levied in proportion to the

surface of the deck, so that this shape also improved the ratio of cargo to toll. Furthermore, at that time Holland was a low wage country. Around 1500 Holland had a 70% share in all passages along the Sont.

And so a triangle of trade was achieved: Holland-Baltic-Iberia. By chance of location and politics, the Dutch had a competitive advantage here. Baltic competitors could not leave their ice-locked ports until spring had progressed too far for them to make the voyage to Iberia and return before winter. The Portuguese had to await the arrival of their ships from the far East, to obtain the spices that constituted their merchandise, and then it was too late for them to go to the Baltic and return before winter. Situated in between, the Dutch could complete the triangle in one summer. The Netherlands were part of Burgundy, which belonged to the Habsburg empire, under king Carlos of Spain and Portugal, and thereby had access to Iberian ports, which was denied to British and French competitors.

Ships and mills

We mentioned the flute as a naval invention. Dutch expertise in shipbuilding was stimulated in part by cross-fertilization of principles of design and construction between ships, dikes and windmills. Windmills provided an unprecedented source of cheap energy, and a technology to develop and maintain polders and canals. The canals, connecting sea ports with the rivers Rhine and Meuse, provided waterways to carry sea trade into the hinterland, and a driving force of water mills. Wind and water mills were used to add value to traded goods by grinding and sawing: oil

from seeds, timber from lumber, flour from wheat. Mills for sawing enhanced shipbuilding. The building of windmills and ships shared the craft of carpentry, and this dual use, with cross-transfer of innovations drove the craft to great heights of perfection. The industry developed large scale production, with economies of scale in specialization. However, in this development, and the use of new technology such as saw-mills, it met with stubborn opposition from guilds of carpenters and blacksmiths. The development of dairy products provided supplementary and alternative foods to wheat and meat, and constituted an indigenous good for trading, next to herrings.

Conditions for expansion

The trade between the Baltic and southern Europe provided the economic and technological basis for later expansion of trade across the world. Some background on the political situation is necessary to appreciate what happened.

The northern Dutch were attracted to the emerging protestantism, which brought them into conflict with their catholic ruler Spain, in a war that lasted for eighty years. In 1579 the Netherlands declared itself an independent republic. Curiously, during most of the war the Dutch kept on trading with its enemies. Spain and Portugal blocked Dutch access to their ports several times, but found that they themselves could not do without that trade. However, this showed to the Dutch how vulnerable they were to exclusion, which stimulated a drive towards their own access to the sources of spices, in the far east. Furthermore, undersupply of pepper by the Portuguese had pushed the price up. The Portuguese grip on

trade was weakening due to corruption and lack of entrepreneurial dynamics: it fell under the authority of the crown, and was driven by nobility and soldiers rather than merchants, who were considered inferior.

The emerging northern Dutch cities, led by Amsterdam, had still been dominated by Antwerp, but when that city was taken by the Spanish forces, the northern cities blocked its access from the sea. Merchants and the booming textile industry moved north, and further strengthened the position of the northern Netherlands.

The VOC

To undertake a breaking of the Portuguese monopoly in the far east, the Dutch VOC (united east india company) was instituted in 1580. It constituted the invention of the company with limited liability and spread ownership of shares that were traded on a stock exchange in Amsterdam. This emerged from the earlier practice of spreading risk by merchants taking "parts" (shares) in individual voyages and settling up after the sailing. The VOC started with 1143 shareholders, a representative board of 60 governors, and an executive board of 17 directors (the "lords seventeen"). It was thoroughly bourgeois; completely outside any realm of crown or nobility. This reflected the political situation more generally. Public administration was decentralized by town, with merchants dominating town councils. The VOC was a joint venture of six towns. Amsterdam was by far the largest, and held 8 of the seventeen seats in the lords seventeen, but its domination could be blocked by a coalition of the remaining 9 seats. The

VOC was given an extraordinary monopoly by a state charter, which included the right to form an army, build fortresses abroad, make treaties with foreign powers and wage war with them.

Take-off

To circumvent the Portuguese, the Dutch first made repeated trials to find a route to the east along the north. This led to a disastrous stranding and hibernation on the island of Nova Zembla, in the Polar sea. In 1595 a first attempt was made along the south, around the Cape of Good Hope. 4 ships with 240 men set out; after 30 months 3 returned with 87 men, with a payload equal in value only to the original investment. In 1598 the merchants upped the ante: they tried again with 22 ships, and succeeded.

Subsequently, a major innovation in trade routes was made. To get to the east from Europe, one first had to take the southwest winds towards Brazil (which is how the Portuguese discovered Brazil), and then try to make connection with the easterly winds past South Africa (the "roaring forties"). The Portuguese then went north, along Madagascar, to pick up the northeasterly winds to India and on to Malaya. But in the winter those winds reversed, and that route was blocked. The Dutch discovered that if you continued east from South Africa, the roaring forties would take you all the way to the West coast of Australia, after which you could go north to the East Indies, and this passage was available all year.

An eastern hub

Communication was difficult: a letter from Holland to the East Indies took 20 months for an answer. Furthermore, to ship spices from the Indies to Holland and transport mostly money back for new purchases, with useless ballast added only for stability of the ship, was cumbersome and risky. Also, an increasing need was felt to have a local wharf for repairing ships. The solution of these problems was to establish a local hub for intra-Asian trade, administration and repairs. For this the Dutch chose Batavia (the present Djakarta) on the island of Java in the East Indies. This turned out to be the beginning of a colonial regime. The intra-asian trade system run from Batavia, provided a basis for a network of trading posts and corresponding fortresses in Siam, the Moluccas, Sumatra, Birma, Malabar, Ceylon, Japan, Malaysia, Arabia, Persia, Coromandel, Gujarat, China and Formosa, with trade in silks, textiles, tin, hides, cloves, nutmeg, rice, sugar, pepper, rugs, cinnamon, silver, copper, salpeter, opium, indigo, coffee. The location in Japan, which was crucial for control of the China trade, constituted the most pronounced Dutch monopoly: only the Dutch presence was tolerated by the incumbent Japanese shogunate. The network of trade locations was utilized as a trade intelligence network, with unparalleled exploitation and control of demand and supply conditions.

Profits soared. In 1650 a first dividend was paid out at a rate of 8 times the original investment, and the increase of share value had been an average of 27% per annum in the 70 year period. The Dutch fleet of some 2500 vessels was larger than those of England, France and Spain put together. Around 1700 the VOC

employed about 25000 people. About half were military personnel, and at any time more than a quarter were on route.

Holland developed a level of urbanization that was unparalleled anywhere until the 19th century, with associated schooling and systems of care for the poor.

Decline

In retrospect one can see the beginnings of the decline at the height of apparent success, from about 1670 onwards.

Failure emerged from several causes. First of all there was a stark contrast in goals between the home country and the administration in the East Indies. The first was decentralized, entrepreneurial and intent on building and maintaining foreign locations only as footholds for trade. The second was rigidly centralized and intent on building a colonial empire. Employees were underpaid in high risk jobs: about a quarter of a ship's crew died on the voyage, and survivors were subjected to tropical diseases. This invited corruption as a source of side earnings.

The Japanese increasingly imposed conditions for the privileged Dutch position; the Dutch settlement on Taiwan was overrun by the Chinese in 1662. Margins declined due to increasing competition. A fixed installed base of settlements and fortresses burdened a dwindling volume of trade with narrowing margins. There was monetary mismanagement and lack of information on sources of cost and revenues, so that wrong decisions were made.

The rigid centralization at Batavia became a burden: the freshness of spices and tea was jeopardized by the detour via Batavia, before shipping to the markets

in Europe. In the tea trade the British obtained an advantage by shipping directly from the sources in China and India to the home country. In the home markets the British implemented a successful protectionist policy: the shipping of unfinished textiles for finishing in Holland was banned, as were imports from Holland of all goods not produced in Holland. In innovation in shipbuilding the initiative was being taken over by the British.

The rivalry between England and Holland led to a series of naval wars from 1650 onwards. The Dutch lost the first, and won the second, after which trade in the East was divided between the two powers: China and India for England and the East Indies for the Dutch.

Profit turned into loss from 1689 onwards, and losses accumulated for another incredible hundred years until the VOC was finally liquidated and taken over by the government. Accumulated profits in the period 1621-1688 were 47 million guilders (one dollar now is about one and a half guilders); accumulated losses in the period 1689-1790 were 182 million! Note that an inflation rate of 3% per annum yields a multiplication factor of 7000 in a period of 300 years. A million becomes 7 billion. After persistent losses had set in, employment still grew from 2500 in 1700 to 36000 in 1753. Once the moloch was under way it could hardly be stopped, despite its momentous failure. Too many interests were involved, with too many jobs at stake. The success of the VOC was tremendous; it was exceeded only by its failure.

In the period 1745-1815 Holland developed its position as exporter of foods and agricultural produce. Its success and subsequent failure in trade capitalism

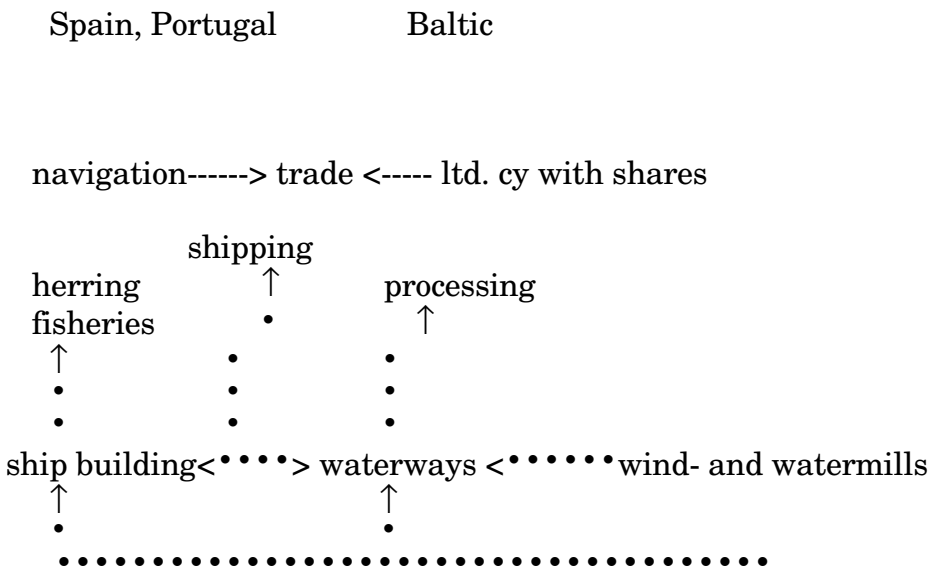
retarded its development of industrial capitalism, which did not really get under way until the end of the 19th century. This still shows, in a limited scope of manufacturing industry.

The golden cluster

Indeed, we do find a cluster at the basis of Hollands Golden Age. It is illustrated in figure 1.

figure 1

THE GOLDEN CLUSTER OF THE VOC
(15th - 16th century)



This constitutes what might be presented as a classical exemplar of a cluster. We see a dynamic of triangular trade. We see a triple synergy between on the one hand technology and manufacturing, and on the other hand trade: shipbuilding connects with advanced demand in fisheries and sea trade; wind- and watermills

add value to traded goods; windmills and dikes yield waterways to extend trade inland. We see cross-fertilization between different technologies and branches of industry: priciples of design and construction in ships, dikes and mills. We see the role of infrastructure: ports, canals, rivers, dikes. We see the role of appropriate innovation in organization: the company with limited liability and tradable shares, to cope with the high risks of sea trade. In the story behind the scheme we see the paramount role of daring and tenacious entrepreneurship and innovation: the invention of a process for preserving herring; the design of a new type of ship; the - breaking of the Hanseatic cartel; the forcing of a route to circumvent the Portuguese; the daring to explore a novel route along Australia; development of a technology of navigation (map making, knowledge of streams and winds).

History

But we also see things that are not usually included in the notion of the cluster or diamond. The notion lacks a historical dimension. We see a crucial role for sheer luck, historical coincidence, and political conditions. The coming together of diverse causes at just the right time: the pull of demand, the push of technology, availability of resources, the impulse of entrepreneurship, the conditions of politics, culture and infrastructure.

Sheer luck: the location of Holland between Baltic and Iberia, and at the estuary of great rivers.

Historical coincidence: the herring moving their spawning grounds from the Baltic to the North sea, presenting a window of opportunity, taken by entrepreneurship

and supported by the invention of a technology for preservation of the herring.

Political conditions: Holland's access to Iberian ports, as part of the Habsburg empire; the fall of Antwerp as a competing port.

Culture: a protestant, rebellious, bourgeois culture breaking through cen-tralized, authoritarian forms of "governance", fostering decentralization of initiative and entrepreneurship.

We also see an important role of technology, developing to some extent autonomously along a "technical trajectory" (Dosi, 1984). In this case a naval trajectory, extending across different economies and cultures. It developed over more than four centuries, as a carrier of European expansion more in general. In the early days, Western European ships carried only square sails, which yield great speed with the wind from behind, but are inflexible. An important shift occurred with the adoption by the Portuguese of the triangular lateen sail from the Arabs, which makes ships more maneuverable, and allows for sailing in diverse directions and speeds of wind. That was crucial, in reducing idle time of ships stuck inside ports or anchoring outside.

Dutch contributions were: the transition from clinker-built to smooth bodies (to increase speed); optimization of the relation between volume, speed and need for crew, in the design of the flute ship; mounting guns on ships of adjusted design; further differentiation of ship design to serve diverse purposes: for returning large freights from the far East, for fighting, for local trade, for sailing up rivers, for reconnaisance. An invention whose purpose is not yet clear is the double hull. The technical trajectory included the development of many subsidiary and supporting

technologies and skills: rigging, making of sails and rope, the sourcing of the best materials from different countries, compass, sextant, map making, knowledge of sea streams and winds. But also in the development of double entry bookkeeping, letters of credit, bills of lading (adopted from the Venetians).

But the technical trajectory started before the Dutch, and proceeded beyond them. The British later added teak as a building material, and the use of copper plating on the ship's hull to eliminate the "beard" of organic growth that slowed ships down. Also, the British invented the use of detailed designs and specifications of ships on paper, which considerably reduced transaction costs in commissioning the building of ships, and greatly facilitated the teaching of ship design[1]. It helped to develop shipbuilding from a craft to an industry, and to supply it with a more scientific basis.

Conclusion

Porter's notion of a cluster or diamond materializes clearly: we find what may be used as a paradigmatic example. But we also find that its operation is strongly contingent upon historical, cultural and political conditions, in which it is embedded. Coincidence in time and space play a large role. This increases doubts about the possibility of designing the basis for economic success, in industrial policy.

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Footnotes

1. In Dutch practice, the ship's architect had to visit the wharf to instruct workers and visually inspect progress, and due to a lack of detailed drawings and specifications there could be extensive bickering concerning intentions and results. The lack of specific drawings yielded the need for higher levels of trust. In other words: transaction costs were high. Furthermore, training of apprentices also meant that they had to accompany the master to the wharf to imitate his craft. The use of drawings for improved efficiency and transfer of knowledge is a nice example of the general need for the codification of previously "tacit" knowledge as a necessary means of progress and diffusion.