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Russian-Dutch technological relations in the 18th century: a comparative view

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Introduction

During the past few centuries the world has seen several times a shift in ‘technological leadership’ Nowadays, the United States is the leader in many fields of technology. Before that, Great Britain and Germany held a similar position. In Europe in the Late Middle Ages and 16th century technological leadership rested in Northern Italy, South Germany and Flanders, and in the 17th and 18th century, the leading country in technology in Europe was the Netherlands.

‘Technological leadership’ is here taken to mean that a given country, region, town or cluster of towns plays an initiating role in the development of new technologies in a wide variety of fields. Indicators for technological leadership can be levels of productivity (which can be expressed in quantitative terms, but also opinions of contemporary observers about relative levels of technical performance and the direction and frequency of export of technological knowledge. According to these indicators the Netherlands in the time of was indeed a site of technological leadership and was clearly perceived as such after about 1670. Since then, the Dutch Republic was viewed as a kind of technological paradise.¹

What I will do in this essay, is to try to put Russian-Dutch technological connections in context by placing them against the background of the technological leadership of the Dutch Republic. First, I will talk briefly about the idea of the Dutch Republic as a technical paradise, then about the export of technology from the Dutch Republic in general and finally, about the special aspects of the technological connections between Russia and the Netherlands in the 18th century.

The idea of the Dutch Republic as a technical paradise

The idea of the Dutch Republic as a technological paradise first arose about 1670.² One of the first leaders in Europe to spot the technological potential of the Netherlands was Jean-Baptiste Colbert, the powerful minister of Louis XIV of France. When Colbert set out to promote the wealth of France by means of technological innovation, he took especially the Dutch Republic as a model. Colbert did not only take steps to recruit Dutch entrepreneurs and skilled workers in shipbuilding and textile manufacture to France, but he also for example sent a special envoy to the Low Countries to make on the spot a wide-ranging, detailed study of canals and the construction of locks, sluices, bridges, dikes and drainage mills, and contact craftsmen who might be willing to sell their expertise to foreign employers.

The idea of technological leadership of the Dutch Republic became widely shared in other countries in Europe. When other states in Europe, such as Tuscany or Sweden, in the later seventeenth century began to develop similar designs for promoting wealth as the King of France, they, took the Dutch Republic as a model too. Grand Duke Cosimo III of Tuscany, for example, in the late 1660s shortly before his accession to the throne twice visited the Netherlands himself.³ When he sent Pietro Guerrini in 1682 on a mission to various countries in Northwest Europe to gather information on all sorts of military and civil constructions, Guerrini's first lengthy stop on his trip was in Holland. For months on end, a steady flow of reports with detailed descriptions and drawings of technical artefacts in the Dutch Republic reached the desks of the grand-ducal chancery back home in Florence.

About 1660, the Swedish ambassador at The Hague Harald Appelboom drew up a list of 87 topics suitable to be studied by a visitor to Holland and a second, shorter one with some subjects of 'top priority'. These checklists together covered almost every part of Dutch economic life and many other aspects of Dutch society as well; Swedish bureaucrats were increasingly keen on getting a full and exact picture of the state of Dutch technology as well.

While the efforts of the Swedish *Kommerskollegium* in the 1650s were still mainly aimed at recruiting craftsmen from Holland to Sweden (especially specialists in textile making or shipbuilding), the *Bergskollegium* in the 1690s sent Samuel Buschenfelt and Christopher Polhem to make a trip to Northwestern Europe to study with their own eyes every piece of technology that might be useful to the Swedish state. Like Guerrini from Tuscany, these travellers from Scandinavia first of all headed for the Dutch Republic. The Netherlands had reached the status of the foremost centre of excellence in technology in Europe.

How long did the idea of Dutch technological leadership last? The perception of Dutch superiority in technical matters, especially with regard to mechanical skills, was still widely shared among well-informed people in Europe in the second half of the eighteenth century. Even if England became an increasingly common destination for technological travellers and industrial spies and even if English inventions and improvements figured prominently in the growing technological literature on the European Continent, the Dutch Republic still had a powerful appeal on foreigners who wished to get acquainted with cutting-edge technology.

Frenchmen and Germans, in particular, remained strongly convinced that the Netherlands still harboured a huge stock of special, valuable technical knowledge. The French were therefore extremely pleased to have finally 'free access' to this treasury of knowledge after the invasion of the Dutch Republic in 1795. Germans never were more curious about technology in the Netherlands, and never published more about it, than in the period between about 1780 and 1810. If one wishes to pinpoint the moment that the Netherlands finally lost its status as a technological paradise for foreigners, the most plausible choice would be the end of the Napoleonic Wars, not before.

Export of technology from the Dutch Republic

The idea of technological leadership of the Dutch Republic went together with a huge export of technological knowledge from the Netherlands to other countries in Europe, and beyond. The export took place in many ways: via technological journeys, via training and apprenticeship of foreigners, via the recruitment of Dutch skilled workers, via the transfer of equipment, materials and models and via the spread of technological literature.⁴

From the late seventeenth century onwards, increasing numbers of travellers flocked to the Netherlands with the express purpose to observe technological practices and artefacts. The Dutch Republic became for a long time a favourite destination for technological journeys. Frenchmen, Italians, Swedes, Englishmen, Scotsmen, Danes, Prussians, Russians – all of them travelled *en masse* to the Netherlands on behalf of governments, entrepreneurs, or on their own initiative, to grasp the secrets of the technological success of the Dutch. Millers in Zaandam, cloth makers in Leiden, bleachers near Haarlem, pipe makers in Gouda, masters of chemical workshops in Amsterdam, dikers, locksmiths, and bridgemen throughout the land – all of them saw foreign travellers appear,

equipped with pencils and notebooks, who eagerly wanted to know how exactly the Dutchmen went about in their job and how their implements and machines actually worked.

One of the highlights of every technological journey to the Netherlands was a visit to the estate *Zijdebalen* of Jacob van Mollem near Utrecht, which since 1681 housed a state-of-the-art water-powered silk throwing mill. The Swedes Buschenfelt and Polhem managed to study the construction and workings of the machine during their trip in detail in the 1690s and an envoy of Czar Peter did the same about twenty years later.⁵

From the seventeenth century onwards, it also became more and more common for foreigners enter a training or apprenticeship program in the Netherlands. Young men from Lübeck, Danzig, Frankfurt or Paris came, for example, to Amsterdam to learn the goldsmith's art, the locksmith's trade or the hatmakers' craft, or to study the art of navigation at a private nautical school, or engineering practice and practical mathematics in the States army or the engineers' school in Leiden.

The principal way of transfer of technology from the Netherlands to other countries was the movement of people. Emigration of Dutch skilled workers never reached a massive scale, however. The Dutch Republic never suffered such an abrupt, severe and enduring loss of skills by migration of people as, for example, Flanders and Brabant between 1570 and 1630, or France after the Revocation of the Edict of Nantes. Even after Dutch industry by the mid-eighteenth century had entered a period of prolonged decline, the outflow of skilled people did not attain levels that came anywhere near the number of those involved in these enormous diasporas from Flanders and France.

Skilled workers in the Dutch Republic during the seventeenth and eighteenth centuries were in general not eager to leave their homeland. Those who nevertheless did so, usually went in response to calls from foreign recruiters rather than on their own initiative. Recruiting efforts were either undertaken by foreign entrepreneurs (or their agents) or by representatives of foreign governments.

Such efforts by no means remained a specialty of France. In 1672 and 1680, for example, the Netherlands was targeted as a recruiting ground for skilled people for trade and industry in Denmark by the newly-founded *Kommervekollegium* in Copenhagen. Sweden had its recruiting agents, too. During the Anglo-Dutch Wars, the Swedish *Kommerskollegium* already seriously discussed schemes to take advantage of the temporary economic crisis in the United Provinces by sending recruiting parties to lure away skilled workmen and it became ever more active in recruiting workers in the Netherlands during the heyday of Swedish mercantilism after 1740. Britain, Spain, Prussia and Russia did the same.

As a rule, this movement of skilled people from the Netherlands only involved small numbers at a time. Migrants moved in twos or threes, and not seldom alone. When craftsmen went to practise their trade abroad they normally did so only for a limited period of time and often without even arranging to take their families along. A papermaker Dideloff Dircksz. van Leeuwen, for instance, in 1718 contracted with an agent of Czar Peter in Amsterdam to practise his art in St.Petersburg, and teach his skills to native pupils, for a period of three years, with a possible extension of another twelve months. Of his salary of 80 guilders a month, thirty would be paid out to Van Leeuwen himself, while the remainder would be disbursed to his wife (or any other trustee he wished to name) who stayed behind in Holland.⁶

Movements of skilled people were complemented by other ways of transfer of technical knowledge. Export of machines, tools and implements was under way from at least the middle of the seventeenth century and significantly increased in the eighteenth century. The mere fact that the States General about 1750 issued bans on the export of mills or parts of mills, and of tools and machines used in textile manufacture, paper making, distilling, white lead making and tobacco pipe making strongly suggest that the transfer of equipment by then had reached a massive scale. Occasional seizures of illegal transports to foreign countries, such a cargo of windmills parts shipped from the Netherlands to Ost-Friesland (Prussia) in 1769 show that these bans failed to stop the traffic.

Technical know-how could also be transferred in the form of seeds of plants. In the 1730s, for instance a certain Johann Heinrich Stiefels brought the first madder plants from Zeeland to the Prussian territories of Cleves, Minden and Potsdam. A migrant labourer from Norden in the 1750s smuggled a seed from a madder plant out of Zeeland 'in his butter box' to another Prussian territory, Ost-Friesland,⁷

Another kind of artefact that could embody technical knowledge, were small-scale models. Models became in the Netherlands in the seventeenth century a common aid for instruction on matters of technology. By the end of the century, these portable, three-dimensional images of technical achievement also began to move across the borders of the United Provinces. Colbert's agent La Feuille, for example, during his trip in Holland in 1670 got hold of models of a mud mill, a saw mill and doors of locks and sluices and sent these to France in 1670. Traffic in models of Dutch windmills became quite lively in the middle of the eighteenth century. The Royal Society of Arts in London in the late 1750s added several models of Dutch windmills to its collection of machines and instruments. In 1766, the *Kriegs- und Domänenkammer* in the Prussian territory of Minden sent a model of a Dutch oil-mill to its counterpart in Breslau, Silesia. The *Oberbaudepartement* in Berlin in 1770 received a model of a *poldermolen* from the *Kammer* in Aurich, Ostfriesland.

Finally, technological literature. Before the middle of the seventeenth century, books or treatises on technical practice in Holland were still in short supply. The technical literature that appeared in print mostly related to the arts of surveying, fortification or navigation. But this literature soon began to find its way to other countries in Europe. Dutch books on the art of navigation, for example, spread widely throughout northern and western Europe. Manuals published by Claes Hendricksz. Gietermaker in 1659 and 1660, for example, are known to have been used at nautical schools in Scheswig-Holstein for almost 130 years. They were very common in Norway and Denmark, too. Of the many other Dutch books in the field of navigation circulating among seafarers in the north, including Russia, the most popular one was probably the *Schat-kamer ofte kunst der stuurlieden* by Klaas de Vries, first published in 1702.

Like manuals of navigation, books on mill design, mostly published in the 1730s, found their way to many users abroad. Foreign travellers interested in Dutch windmill technology, such as Leonhardt Sturm, John Smeaton or Johann Busch, carried copies of mill-books as they moved in Holland from one interesting site to another. Mill-books thus served as a sort of a travel guide. Thanks to these mill-books, foreign observers knew where to look when they entered the technological paradise in the Dutch Republic..

A special relationship: Russia, Peter the Great and the Netherlands

The transfer of technology from the Netherlands to Russia, which took off in the time of Peter the Great and continued throughout the eighteenth century, thus fitted in many respects in a more general pattern of export of technology from the Netherlands. Still, we can detect special aspects about the technological relations between Russia and the Netherlands.

First of all, of course the sustained personal interest and commitment of Czar Peter the Great, which gave a boost to the technological transfer and kept it going for a long time. This personal interest and commitment went way beyond the interest and commitment of other rulers in Europe. Even Cosimo III of Tuscany, did not settle for months in the Netherlands to be trained as a shipwright at the yard of the East-India Company in Amsterdam and the dockyards in the Zaanstreek, nor did he take lessons on the art of navigation in a nautical school, like Peter did in school of Jan Albertsz. Van Dam, examiner of pilots of the Chamber of Hoorn of the VOC.⁸

Secondly, the transfer of technology to Russia covered a very broad spectrum: it ranged from shipbuilding, seafaring, canal building and the fisheries to architecture all sorts of crafts and

industries including textile making, paper making, brick making and arms manufacture. In that respect, it was much wider than, for instance, the case of Sweden, Prussia or even France.

Thirdly, the transfer of technology to Russia, especially in the time of Peter the Great, reached an unprecedented scale, not only in the form of translations of the wholesale purchase of collections but also in the form of large training programs and massive recruitment drives of skilled people. No other state or ruler went so far as to send dozens of its subjects to the Dutch Republic to follow a training in seamanship and navigation. No other state or ruler recruited as many skilled workmen in the Netherlands. A recruiting drive in the wake of Czar Peter's first visit to the Dutch Republic in 1697 led to the migration of probably some 600 artisans to Russia. Cornelis Cruys, a master of equipment at the Admiralty of Amsterdam who became admiral of the Russian fleet, in 1698 hired 231 naval officers, petty officers and common seamen in Holland for employment in Russia and in 1703-1704 recruited another group of 175, including 89 Dutchmen.⁹

No other European power ever reached this scale of recruitment. By comparison, one of the largest recruiting drives in the Netherlands by another European state, namely the campaign by Bourbon Spain in 1718 to attract Dutch workers for a new royal cloth factory in Guadalajara, initially involved only fifty workmen from Leiden. The total size of the local Dutch community in Guadalajara did not amount to more than 300.¹⁰

If the spectrum of fields was much broader and the scale of transfer much larger, one may hypothesize that the impact of the Dutch transfer of technology to Russia on the Russian economy must have been greater than in other European countries at the time. This is surely an interesting topic for further research. It is in any case significant that, in contrast with the transfer of technology to France, Britain, Sweden, Denmark, Germany, Spain or Italy, Russian-Dutch connections in technology in the 18th century are still widely remembered and commemorated.

¹ Karel Davids, *The rise and decline of Dutch technological leadership. Technology, economy and culture in the Netherlands, 1350-1800* (Boston/Leiden 2008) 3-10.

² The following section is based on Davids, *Rise and decline*, chapter two.

³ G.J. Hoogewerff (ed.), *De twee reizen van Cosimo de' Medici Prins van Toscane door de Nederlanden (1667-1669). Journalen en documenten* (Amsterdam 1919).

⁴ The following section is based on Davids, *Rise and decline*, chapter five.

⁵ University Library Uppsala Ms. X 306 S. Buschenfelt, 'Berättelse till Bergskollegium', esp.f. 22-24, Rienk Vermij, 'Bedrijfsspionage in de achttiende eeuw. Een agent van de tsaar te "Zijdebalen"', *Maandblad Oud-Utrecht*, 63(1990) 107-110.

⁶ Davids, *Rise and decline*, 272.

⁷ Davids, *Rise and decline*, 324.

⁸ Karel Davids, 'On the diffusion of nautical knowledge from the Netherlands to north-eastern Europe', 1550-1850', in: W.G. Heeres *et al.* (eds.), *From Dunkirk to Danzig. Shipping and trade in the North Sea and the Baltic, 1350-1850* (Hilversum 1988) 217-236, p. 227.

⁹ Davids, *Rise and decline*, 274, 327.

¹⁰ Davids, *Rise and decline*, 330.