

Viabundus Denmark

Documentation, The Danish subproject version 1.1 and 1.2

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Table of contents

Introduction	2
Danish Research in medieval and early modern roads	4
Character of roads in medieval and early modern Denmark	6
The digitisation of edges	7
Edges in the Danish dataset: Main routes of Denmark 1350-1650	11
<i>Northern Jutland</i>	12
<i>Central Jutland</i>	12
<i>Southern Jutland and Schleswig</i>	14
<i>Funen</i>	14
<i>Zealand</i>	15
<i>Lolland and Falster</i>	16
<i>Scania</i>	17
Nodes descriptions in the Danish dataset	18
<i>Names</i>	19
<i>Settlements</i>	19
<i>Towns</i>	19
<i>Tolls</i>	20
<i>Staples</i>	21
<i>Fairs</i>	21
<i>Bridges</i>	23
<i>Ferries</i>	24
<i>Harbours</i>	24
<i>Locks</i>	25
Credits	25

Introduction

The Danish subproject of “Viabundus – Map of premodern European transport and mobility” (Viabundus Denmark) is based at Moesgaard Museum and financed by Kulturministeriets Forskningsudvalg (the Danish Ministry of Culture). Institutionally, the project is the result of a close collaboration between Moesgaard Museum, Archaeological IT (Moesgaard Museum/Aarhus University), and the Danish Centre for Urban History as well as the Danish Museum of Urban History, Den Gamle By (The Old Town). Viabundus Denmark received funding in June 2018, and the first version of our data was published as part of Viabundus version 1.1 in December 2021. This documentation file was published in September 2022, coinciding with the release of Viabundus version 1.2. The goal of the documentation file is to present the work done in the Danish subproject. This is done by unfolding the methods which formed the foundation of our work and introducing the central parts of our dataset. The focus lays on the digitization of the main roads (*edges*) registered on maps of The Royal Danish Academy of Sciences and Letters and the character of the descriptions of the various localities of relevance to travellers (*nodes*) in Viabundus version 1.2.¹ An introduction to the Viabundus database construction, for example the project’s definition of central concepts such as *edges* and *nodes*, can be found in the general documentation file at www.viabundus.eu.²

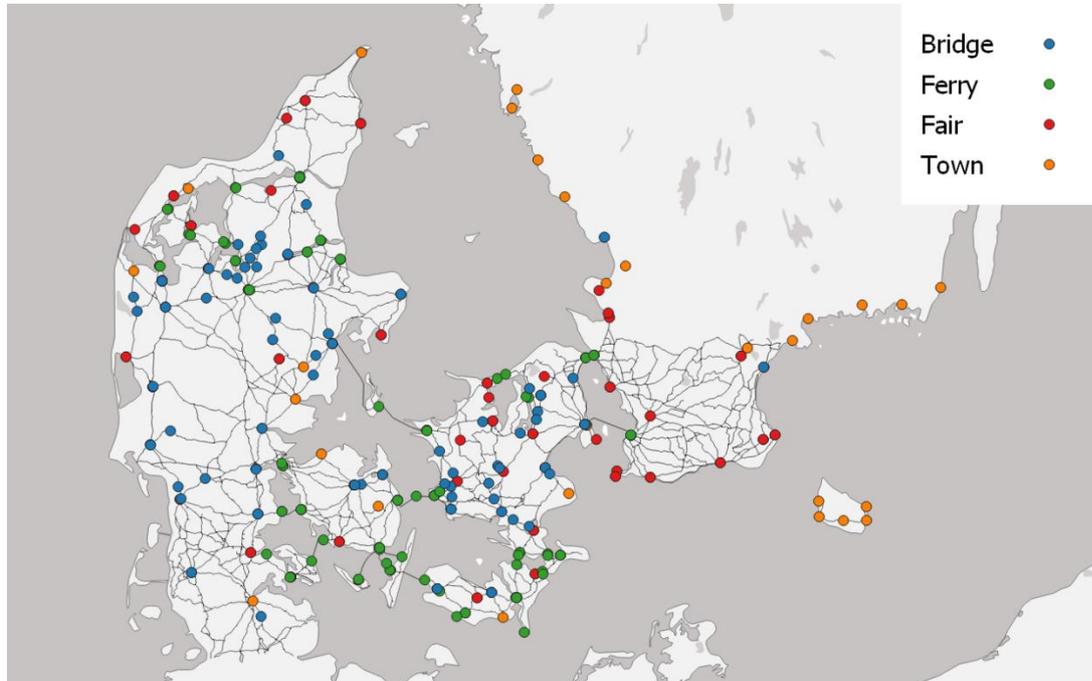
The aim of Viabundus Denmark is to digitise and map the public main roads of late medieval and early modern Denmark, and to develop an attached dataset about towns, fairs, ferries, bridges as well as other places of relevance to physical mobility in the kingdom of Denmark within the time frame *c.* 1350-1650. The geographical focus is the area which corresponds to modern day Denmark and to some extent the southern regions of modern Sweden: Scania, Halland and Blekinge, as these regions belonged to the Kingdom of Denmark until the middle of the 17th century. In the same manner, the region of Schleswig is partly included in the Danish Viabundus subproject, as this part of northern Germany constituted the Duchy of Schleswig, which historically was attached to the Danish kingdom.

Viabundus Denmark is focused on the area, which constitutes modern Denmark, and therefore the regions of Scania, Halland and Blekinge have not yet been analysed in detail. All privileged towns in the three modern Swedish regions are registered and described in the dataset, and so

¹ Because Viabundus Denmark was first published as part of Viabundus version 1.1. this documentation should be used for a better understanding of both version 1.1 and version 1.2.

² B. Holterman, M. A.B. and M. C. Degg, *Viabundus documentation, Version 1.1*. (August 2022).

are the most important ports and ferries as well as the annual fairs along the coast. But compared to other regions in medieval and early modern Denmark only a limited number of localities of relevance to the late medieval or early modern travellers (*nodes*) have so far not been included in the dataset. In the same manner, only the historical road network in Scania is digitised in Viabundus version 1.2.



This figure illustrates the heterogeneous character of the Danish dataset. So far, no edges/roads in the provinces of Halland and Blekinge have been digitised, and only the towns and most important fairs and ferries of Scania have been included among the nodes in the Danish dataset. Villages, most bridges, inns etc. in Halland, Scania and Blekinge are not included in the dataset.

In contrast to other Viabundus subprojects, it was not possible to base the digitisation of the Danish road network on the roads registered in the atlas of *Hansische Handelsstrassen* by Friedrich Bruns and Hugo Weczerka, as only a very limited number of roads and towns in the region of Jutland were registered by Bruns and Weczerka.³ Instead the digitisation of the main public roads in Denmark is based on the 18th and 19th century maps produced by Det Kongelige Danske Videnskabernes Selskab (The Royal Danish Academy of Sciences and Letters). It was not our ambition to register every route on land (*edges*), but to focus on the main roads or routes, i.e. the public or common main roads which connected privileged towns, larger annual fairs and ferries as well as other localities (*nodes*) of relevance to the movement of people and

³ F. Bruns & H. Weczerka, *Hansische Handelsstrassen. Atlas*, (Köln, 1962), Karte I.

goods in late medieval and early modern Denmark. In addition to the maps produced by The Royal Danish Academy of Sciences and Letters, the Danish dataset is based on other cartographical sources from the 17th to the 19th century,⁴ as well as Danish archaeological and historical research including surveys of various primary written sources.

Danish research in medieval and early modern roads

The earliest interest in the character of the Danish roads or routes on land is found in medieval texts from the late 11th century onwards. However, as in other parts of Europe, the contemporary information about travelling by land, or for that matter by sea, is limited to textual sources such as chronicles and a relatively small number of travelogues. As elsewhere in Europe the travelogues are not very useful for the study of historical roads or routes on land, as they do not pay much attention - if any at all - to the exact roads to travel or exact routes to follow.⁵ Accounting books or registers related to various kinds of travel constitute a particular interesting group of sources. Of course, these texts are not focused on the exact roads or routes to follow as well, but they often contain information on fees travellers had to pay during a journey, for example to cross a bridge or to use a ferry.⁶

In Danish historical and archaeological research a couple of pioneer works on the historical road network of Denmark were produced in the late 19th century and the early 20th century.⁷ In his classical study of the prehistoric settlement structure and its relation to the routes or paths in the landscape, the Danish archaeologist Sophus Müller argued that the settlement pattern of the Stone Age and Bronze Age, especially burial mounds, indicated the course of physical movement in the landscape, as the mounds were built near routes or paths that were defined by the topographical character of the landscape.⁸ Since Müller's study it has been broadly recognized in Danish research that various elements of the historical settlement structure such

⁴ One example is the mapping done by the Danish cartographer Johannes Mejer in the 17th century. On Mejer's maps as well as other relevant maps from this period see P. Dam, *Kortlægningen af Danmark – op til midten af 1800-tallet*, (København, 2019); P. Korsgaard, *Kort som kilde – en håndbog om historiske kort og deres anvendelse*, (København, 2006); B. W. Dahl, "Det topografiske Danmarkskort", *Bol og by. Landbohistorisk Tidsskrift 1*, (1997), pp. 36-59.

⁵ N. Hybel & B. Poulsen, *The Danish Resources c. 1000-1500. Growth and Recession* (Leiden & Boston, 2007).

⁶ One example is the accounting books of 15th century nobleman Mourids Nielsen Gyldenstjerne: "Mourids Nielsen Gyldenstjernes regnskaber", *Danske Magazin* bd. 50:2, Troels Dahlerup, Jeppe Büchert Netterstrøm & Bjørn Poulsen (eds.), (København, 2008).

⁷ For further introductions to the Danish research in road networks during the Middle Ages and early modern era see M. Hertz, "Vejhistorie og vejhistorisk forskning i Danmark", *Vejhistorie. Tidsskrift fra Dansk Vejhistorisk Selskab 1* (2000), pp. 13-14; M. Hertz, "Vej- og trafikhistorisk forskning i Danmark", *Vejhistorie. Tidsskrift for dansk vejhistorisk selskab nr. 5* (2002), pp. 4-8.

⁸ S. Müller, "Vei og bygd i sten- og bronzealderen", *Årbøger for Nordisk Oldkyndighed 11*, (1904), pp. 1-64.

as burial mounds, churches, villages, towns and castles can be used to identify historical roads or routes, and several studies have been inspired by his work. Other classical studies of the history of roads within the Danish medieval kingdom were carried out by the historians Hugo Matthiessen and Troels Frederik Troels-Lund. The latter focused on common people's relationship to the roads and other elements in the infrastructure (ferries, bridges etc.) of late medieval and early modern Denmark (and partly Norway) in his fourteen-volume cultural-historical work *"Dagligt Liv i Norden i det sekstende Aarhundrede I-XIV (1879-1901)*.⁹ Matthiessen published two books on the premodern roads: *Hærvejen, en tusindårig vej fra Viborg til Dannevirke* (1930) and a few years later *Viborg veje* (1933), which ever since have had a huge influence on historians and archaeologists, who have been studying the historical roads of Denmark, in particular Jutland.¹⁰ A contemporary of Matthiessen was the engineer J. Th. Lundbye, who also was a significant contributor to this early phase. Lundbye both worked with various aspects of the character of roads and infrastructure at a national level,¹¹ and conducted several detailed studies of the road networks of different regions in Denmark.¹²

The four scholars mentioned above – as well as others – lay the foundation for future research in the road network and infrastructure of medieval and early modern Denmark, and the interdisciplinary field was expanded significantly in the second part of the 20th century. Torben Topsøe-Jensen published several works on various aspects of the history of the Danish roads, most relevant is the monograph *Ad hjulspor og landeveje* (1966),¹³ in which Topsøe-Jensen sought to uncover central developments from pre-historic times up to the industrialization of Denmark in the 19th century. Another and particularly important contribution to the field in the second part of 20th century is Alex Wittendorff's book *Alvej og kongevej* (1973).¹⁴ His work focused on the road system on the island of Zealand in the early modern era, but especially when it came to the character of roads, bridges, and fords, Wittendorff also analysed sources from other regions within the realm. Since the 1970s Per Ole Schovsbo has been a central researcher in the field, and his works on the history of transportation and different approaches

⁹ T. Troels-Lund, *Dagligt Liv i Norden i det sekstende Aarhundrede*, (København 1879-1901/6. edition. 1968-1969).

¹⁰ M. Hertz, "Vej- og trafikhistorisk forskning i Danmark", (2002).

¹¹ J. Th. Lundbye, "Vejenes udviklingshistorie i Danmark", *Fortid og Nutid II*, (1919), pp. 129-143; J. Th. Lundbye, "Danmarks Veje i Oldtid og Middelalder", *Nordisk Kultur XVI* (1934), pp. 200-216.

¹² J. Th. Lundbye, "Vejenes udviklingshistorie i Himmersyssel", *Fra Himmerland og Kjær herred*, (1920), pp. 417-455; J. Th. Lundbye, "Vejenes udviklingshistorie på Lolland og Falster", *Årbog for Historisk Samfund for Lolland-Falster*, (1920), pp. 1-16; J. Th. Lundbye, "Studier i vejenes udviklingshistorie i Aarhus og Skanderborg amter", *Aarhus Stifts Årbog*, (1925), pp. 129-147.

¹³ T. Topsøe-Jensen, *Ad hjulspor og landeveje* (København, 1965).

¹⁴ A. Wittendorff, *Alvej og kongevej*, (1973).

to the historical development of the roads have also been an important source of information for the Danish Viabundus subproject.¹⁵

The works and researchers mentioned above constitute the foundation of the research carried out within Viabundus Denmark, which is also based on research done by many other Danish and foreign scholars. Much of the relevant research is found in *Tidsskriftet Vejhistorie*, a journal on the history of roads and infrastructure of Denmark published by *Dansk Vejhistorisk Selskab* (Society of Danish Road History).¹⁶ An introduction to Viabundus and in particular the Danish subproject is planned for publication in *Tidsskriftet Vejhistorie* in either 2022 or 2023.¹⁷

Character of roads in medieval and early modern Denmark

According to the oldest Danish legal texts (town laws as well as provincial laws), roads and streets had to be maintained by either the town citizens or local peasants. The provincial law of Jutland from c. 1241, for example, contains paragraphs about the character, quality, and maintenance of different categories of roads. Considering the normative character of these legal sources, the effect of this legislation is, of course, questionable, but various legal sources are a reflection of a political awareness of the importance of good and stable infrastructure within the realm.¹⁸ At least from the 13th century the laws distinguished between different types of roads.¹⁹

One category was the minor roads connecting villages and maybe also towns within a certain region, which probably had been determined as part of the cultivation process during the Iron Age, the Viking Age and into the early medieval period, when the village structure was finally settled. These minor roads were generally known as parish roads (“*sogneveje*”). Another category was the main roads, which were public roads, and are known under various names in both the contemporary sources and research literature which all reflect their public character (“*allemandsveje*”, “*adelveje*”, “*alfarveje*”, “*alveje*” or “*adelfarvej*”). In general, these public main roads went through public/royal lands and therefore it rested upon the king to secure and

¹⁵ P. O. Schovsbo, *Hestevogne på landet. Vognene og deres håndværk i kongeriget og hertugdømmerne i det 19. og 20. århundrede*, (Haderslev, 2015); P. O. Schovsbo, *Landtransport i Danmark. Vogne og vej fra 1100-1800*, (Haderslev, 2018)

¹⁶ Digital versions of older volumes of the journal can be found here: <https://www.vejhistorie.dk/>. (August 2022).

¹⁷ K. H. Andersen & P. J. Maring, ”Viabundus. En ny digital indgang vejhistorien ca. 1350-1650”. Submitted to *Tidsskriftet Vejhistorie* ultimo August 2022.

¹⁸ A: Hoff, *Lov og landskab. Landskabslovenes bidrag til forståelsen af landbrugs- og landbrugsudviklingen i Danmark ca. 900-1250*, (Aarhus, 1997), pp. 288-315.

¹⁹ A. Wittendorff, *Alvej og kongevej*, (1973).

regulate this category of roads, which in Latin sources often were characterized as *via regia*. The main roads were probably defined in the 12th and 13th centuries, when privileged towns were established all over the Danish kingdom, and in general they followed the same routes up until late 18th, when the Danish network of roads began to change fundamentally. The public main roads have developed naturally through centuries, and in general the roads or routes followed the topographical character of the landscape. Only a few public main roads were deliberately laid out and planned. Most were therefore unpaved, and when a section of a road became too difficult to use due to weather conditions or too much traffic, a new track was established next to the road. A third category of roads was the king's private network of roads ("*kongeveje*" or "*via regis*"), which was established by king Frederick II (1559-1588) and further developed by his successors. This system of roads was concentrated on the island of Zealand, but also connected some towns and settlements in Jutland such as the towns of Kolding and Haderslev. In contrast to the public main roads, the royal network of roads was planned and well-constructed. It was, however, only the king who was allowed to use these roads, and if ordinary people were caught on the roads, they were punished. Thus, the king's roads were not that important to the general infrastructure in early modern Denmark.²⁰

The digitisation of edges

The groundbreaking maps of The Royal Danish Academy of Sciences and Letters were made in the period 1762-1805 for the Danish kingdom, and during the period 1778-1820 the duchies of Schleswig and Holstein were surveyed. For the first time in history, the responsibility for making as accurate maps as possible was placed in the hands of a scientific institution, which approached the cartographical work with new methods and techniques. The cartography carried out by The Royal Danish Academy was based on a systematic topographical survey of the Danish regions. Using the method of triangulation, the cartographers registered Denmark region by region and drew detailed maps as they went along. In total, 265 individual so-called concept-maps were produced in scale 1:20.000, and their level of detail is quite impressive. A generalized version consisting of 19 maps were later printed in scale 1:120.000, and cover all

²⁰ P. O. Schovsbo, *Landtransport i Danmark*, (2018); A. Wittendorff, *Alvej og kongevej*, (1973); K. E. Høgsbro, "Renaissance – og det danske vejnet", *Vejhistorie. Tidsskrift fra Dansk Vejhistorisk Selskab* 12 (2006), pp. 3-13. M. K. Poulsen-Hansen, "Middelalderens veje – set fra et arkæologisk synspunkt", *Vejhistorie. Tidsskrift fra Dansk Vejhistorisk Selskab* 19 (2011), pp. 3-10.

of present-day Denmark and Schleswig.²¹ Only the generalized maps in 1:120.000 have seen systematic digitization and were published in 2003 as a fully vectorized digital version.²² So far, the detailed concept-maps have not received the same attention.

Any attempt at reconstructing the historical road system of Denmark depends on accurately positioning, i.e. georeferencing the historical maps in a Geographic Information System (GIS). Thus, as part of Viabundus Denmark a total of 180 of the 265 late 18th and early 19th century concept-maps were georeferenced and vectorized. This georeferencing was accomplished by using the medieval churches as control points, which were also used originally during the 18th and 19th century surveying and triangulation. In addition, in areas where the topographical conditions meant that insufficient churches were in line of sight to complete proper trigonometric survey, hilltops (often burial mounds) were used instead. Luckily, the original lines-of-sight are kept intact on the drawn maps, providing crucial information regarding the map-making process, not to speak of visualising the daunting task of surveying the entire country using these relatively simple tools. Most churches and many burial mounds have survived to this day and are in fact some of the best suited map elements for trustworthy georeferencing. Fortunately, the concept-maps have proven to be extremely accurate and internally consistent compared to modern maps and surveys, providing a solid framework for the digitisation.

The argument for using the roads on 18th- and 19th-century maps in the first place is the notion that they were surveyed before the industrial revolution, and thus predominantly defined by topographical conditions - and in all likelihood indicative of the ideal paths through the landscape for decades or even centuries.²³ Arguably, road systems are inherently very stable, as roads and settlements mutually determine their position in the landscape, while the Danish topography in an marshy landscape dictates preferred passage along ridges and watersheds. The relative permanence of road networks is evidently a key factor, and the archaeological evidence is sparse and usually limited to river crossings, holloways and similar topographical 'bottlenecks'. Where available, archaeological and historical sources for bridges and ferries

²¹ P. Korsgaard, "Videnskabernes Selskabs kort", *Perspektiv 5*, (2004), pp. 5–13; P. Korsgaard, *Kort som kilde – en håndbog om historiske kort og deres anvendelse*; P. Dam, *Kortlægningen af Danmark – op til midten af 1800-tallet*, pp. 55-61.

²² P. Dam, "Videnskabernes Selskabs kort – en introduktion til såvel analog som digital brug", *HisKIS' digitale årsskrift*, (2004), pp. 36-44, www.hiskis2.dk [August 2022]

²³ J. Andresen, R. B. Iversen, & P. Jensen, "On the war-path. Terrestrial military organisation in prehistoric Denmark", *Layers of Perception. Proceedings of the 35th International Conference on Computer Applications and Quantitative Methods in Archaeology (CAA)* (Berlin, 2007).

have been used to further substantiate the link between an 18th-century map and road network in the medieval period and early modern era.



A comparison of the level of detail on Videnskabernes Selskab concept-map 1778-1820 (left) and Høje Målebordsblade 1842-1899 (right). The 1st and 2nd order roads are illustrated by different signatures, and the triangulation lines are visible in the concept-map, while the Høje Målebordsblade represent a more accurate mapping.

The roads on the concept-maps are divided into two distinct classes of 1st and 2nd order roads. In practice, this allows us to distinguish between local, minor roads and paths and the regional and national transportation routes, i.e. the public main roads, in the latter being the focus of the Viabundus project. While the 1st order roads in the maps of The Royal Danish Academy of Sciences and Letters are already visibly influenced by the network of marked towns, it is a well-known fact that roads were dynamic and would occasionally shift slightly to accommodate erosion and wear. This is indeed visible in a few places when georeferencing neighbouring concept-maps, which were potentially drawn decades apart, meaning that the exact road courses are only established within a few hundred meters. On the other hand, natural corridors and boundaries, defined primarily by wetland areas and areas of safe passage (i.e. bridges, fords etc.) appear to be much more static, and thus valuable information for this project. The fact that the maps were produced over a relatively long timespan between 1762 and 1820 does result in a somewhat heterogeneous historical source. This is particularly visible in the latest mapped areas (e.g. Schleswig), which show a much denser road network. Also,

royal provisions in 1793 resulted in straightening and upgrades to existing roads,²⁴ which are particularly visible on the island of Zealand. This is one of the arguments for using the original 1:20.000 concept-maps for reference when eliminating younger features present on the published 1:120.000 maps. The concept-maps in scale 1:20.000 contain much more detail in terms of overall resolution, topographical features and cultural- and historical information about land-use.

The digital scans of the original concept-maps were supplied by the Danish Geodata Agency and georeferenced using QGIS and GDAL. The georeferencing algorithm chosen was a standard orthogonal Helmert transformation. This means that angles in the original maps are preserved, and only offset, scale and rotation are applied. Alternatively, n-order polynomial or spline georeferencing could have offered geometric corrections within each individual map, but the distribution of control points, i.e. churches, were so consistent that any distortion is more likely to be related to the original survey rather than subsequent inaccuracies. To address any concerns of inaccuracies of the original surveying, the georeferenced and digitized roads were subsequently correlated with the "Høje Målebordsblade". These are geographically highly accurate topographic maps in 1:20.000, surveyed between 1842 and 1899 and in use until 1920.²⁵

As the provinces of Scania, Halland and Blekinge were no longer included in the Danish realm in the 18th century, the maps of The Royal Danish Academy do not cover these regions. Thus the province of Scania has been vectorized using a map done by the Swedish cartographer Johan Bosson Kempensköld in 1712,²⁶ which is comparable with the mapping done by The Royal Danish Academy. As already mentioned above, it was, unfortunately, not possible to digitise the main roads in the provinces of Halland and Blekinge in Viabundus Denmark. It is, however, expected that this will be done in the future. All medieval and early modern towns of Scania, Halland and Blekinge as well as the most important annual fairs and ports, however, have been registered and described in Viabundus version 1.2., but the remaining categories of *nodes* have not been worked upon yet.

²⁴ T. Topsøe-Jensen, *Ad hjulspor og landeveje*, (1965).

²⁵ P. Korsgaard, *Kort som kilde - en håndbog om historiske kort og deres anvendelse*, (2006).

²⁶ The map of Johan Bosson Kempensköld is available at: <https://historiskakartor.lantmateriet.se/>. [August 2022].

Edges in the Danish dataset: Main routes of Denmark 1350-1650

Denmark covers a part of northern Europe which is dominated by water. The country is located between two seas: the North Sea to the west and the Baltic Sea to the east, and these two seas flow together around Denmark. The main provinces of medieval Denmark are therefore separated by straits of water, which travellers of all kinds had to cross when moving between the different Danish provinces: Lillebælt between Jutland and the island of Funen, Storebælt between the islands of Funen and the island of Zealand and finally the strait of Øresund separating Zealand from the province of Scania.²⁷ Due to the maritime character of the land, the road network of pre-modern Denmark was often interrupted by bodies of water, and the possibility to cross the water barriers was essential to movement of people and goods. Thus, already in the early Middle Ages if not before, a relatively stable network of ferries appears to have been established. In all the Danish regions, also in the regions of Blekinge and Halland, the towns were concentrated along coastlines, which must be seen as a sign of the importance of maritime traffic. However, most medieval towns were also connected by important public main roads.²⁸

The objective with this part of the documentation file is not to unfold the total road network, but to present some of the most significant main routes in Denmark during the period c. 1350-1650. Thus, the following is not a detailed analysis of the infrastructure of late medieval and early modern Denmark, but only highlights some of the most used routes, i.e., mostly public main roads on land but also those ferries, which played a key role in the Danish infrastructure.

A collection of important (and certainly the most famous) routes on land were concentrated on a north-south axis running from the northern part of Jutland all the way down to Holstein in modern Germany in the south. These routes followed the watershed of the peninsula, i.e. the ridges of central Jutland. Traditionally this infrastructural phenomenon, which can be traced back into prehistoric time, has been known as Hærvejen in Danish (The Army Road/The Military Road) or Ochsenweg (The Oxen Road) in German. It is, however, important to emphasise, that Hærvejen/Ochsenweg was neither a single road nor a permanent system of roads, but numerous routes on a north-south axis defined by the topographical character of Jutland. By travelling along the ridges in the central parts of the peninsula, less water barriers (small rivers, fjords, bogs, and lakes) had to be crossed than when travelling in either the

²⁷ N. Hybel & B. Poulsen, *The Danish Resources c. 1000-1500*, (2007), pp. 45-48.

²⁸ H. K. Kristensen & B. Poulsen, *Danmarks byer i middelalderen*, (Aarhus, 2016).

western or eastern parts of Jutland.²⁹ Hærvejen/Ochsenweg played an important role in the dynamic Danish export of oxen to towns in continental northern Europe during the late medieval and early modern era. However, travellers could also follow main public roads in both western and eastern Jutland. Some may be seen as part of Hærvejen/Ochsenweg, some may not.

Northern Jutland

From the urban settlement of Skagen at the northern tip of the peninsula one could travel by two different routes, either to the east or to the west. The western route led the traveller to the town of Hjørring, which was a junction in the road system in the region of Vendsyssel, and the eastern route ran to the town of Sæby. Both the eastern and western route went to the settlement of Sundby (modern day Nørresundby), but by choosing the western route it was also possible to reach the regions in the north-western corner of Jutland, as well as northern shores of the western and narrow parts of Limfjorden. Here travellers had to cross the fjord by ferries, and already at an early stage in the medieval period, well-established and stable ferries were found on several places along the long fjord, which separates the region of Northern Jutland from the southern regions of the peninsula. Travellers on the western route had to use the ferry at Aggersund, while travellers in the east most often chose the ferry connecting the settlement of Sundby with the important town of Aalborg on the southern shore of the fjord. These two ferries were the most popular ways to cross Limfjorden throughout the Middle Ages and into the early modern era, but it was also possible to be ferried across the fjord at other locations.³⁰

Central Jutland

From Aalborg a public main road ran to the inland town of Viborg, which held an important political, religious, and economic position in Jutland. Viborg, which was established in the late Viking Age, was also an important market town, and several fairs were held in Viborg. From the late medieval period onwards, the most important was the interregional fair known as

²⁹ On Hærvejen/Ochsenweg see H. Matthiessen, *Hærvejen*, (1930).

³⁰ In total 23 concept-maps drawn by The Royal Danish Academy were used to digitise the road network in Jutland north of Limfjorden. The concept-maps were supplemented by research on the historical roads in the northern parts of Jutland, for example: C. Klitgaard, *Vendsysselske veje – fra middelalderen til ca. 1860: Historisk-topografiske studier*, (Hjørring, 1936); P. Grau Møller, "Kommunikationsstrukturer i Vendsyssel i 1600- og 1700-tallet". *Vejhistorie nr. 10*, pp. 16-22, 2005; P. G. Møller and N. Haue, "Road network", *From Central Space to Urban Place Urbanisation processes in Viking Age and Medieval Odense and Aalborg, Denmark*, Mads Runge, Malene Refshauge Beck, Mikael Manøe Bjerregaard & Torben Birk Sarauw (eds.), (Odense, 2021), pp. 50-68.

Snapstinget, which took place in January. Viborg constituted a junction for both the north-south oriented Hærvejen/Ochsenweg as well as traffic to both the east and to the west.

From Viborg main roads led to the town of Holstebro to the west, from where travellers could follow two western main routes southwards towards the town of Ribe. The route closest to the North Sea coast ran from the region of Thy on the northern side of Limfjorden to the small town of Ringkøbing. Here it turned south-east to the settlement of Skjern, where it connected to the other main route from Holstebro. Skjern was located at the best place to cross the wide river of Skjern Å, and a bridge is documented from the early 12th century. From Skjern one main road went inland to Hærvejen/Ochsenweg, and another continued southward to the small town of Varde and further down to the important trading town of Ribe, which was founded just before 700 AD and thus is amongst the oldest towns of Scandinavia. Especially during the Viking Age and the first part of the medieval period, Ribe was one of the most important towns of Denmark, and although the town's development stagnated in the Later Middle Ages, it remained an important town within the kingdom. Ribe played an important role in the flourishing export of oxen in the late medieval period and early modern era.³¹ To the east a main road connected Viborg with the town of Randers, another important town in Jutland, from where roads led to the peninsula of Djursland. A third possibility from Viborg was to travel to the southeast across the great river of Gudenå at Kongensbro towards Aarhus. Finally, Hærvejen/Ochsenweg ran southwards from Viborg.

The town of Aarhus is located at the eastern coast in the middle of Jutland, and from the 11th century onwards a ferry connected Aarhus with the minor island of Samsø as well as Zealand. Several public main roads ran from Aarhus to other towns in the region: Viborg and Randers to the north and the small towns on the peninsula of Djursland to the northeast. To the south one route ran to the town of Horsens, from where it continued to the towns of Vejle and Kolding. Another public main route connected Aarhus with the inland royal castle of Skanderborg, which developed into a town during the 16th century. Not far from Skanderborg, near the settlement of Gammel Ry, was the Cistercian monastery of Øm and its annual fair, which in the late medieval period developed into a permanent settlement with an urban character.³² From Skanderborg it was possible to continue southwards to Horsens and further

³¹ M. Søvsg; *Ribe 700-1050. From Emporium to Civitas in Southern Scandinavia*, (Højbjerg, 2020); H. K. Kristensen & B. Poulsen, *Danmarks byer i middelalderen*, (2016).

³² H. K. Kristensen & B. Poulsen, *Danmarks byer i middelalderen*, (2016).

south towards the town of Vejle or travel further inland towards Hærvejen/Ochsenweg.³³ Vejle constituted another junction in the road network of eastern and central Jutland. Beside from the northern road to Horsens, an inland road connected Vejle to Hærvejen/Ochsenweg, and two public main roads ran southwards from Vejle. One road headed directly south to the town of Kolding, and another road ran to the southeast to the ferry in Snoghøj, which connected Jutland with the island of Funen.

Southern Jutland and Schleswig

Kolding was placed at the kingdom of Denmark's southern border to the duchy of Schleswig, and therefore the town was one of the most important royal toll stations, and much of north-south going traffic in Jutland had to pass through Kolding. From Kolding a public main road ran along the northern side of Kolding Fjord to the ferry at Snoghøj, which was one of the most used ferry connections between Jutland and Funen. Another public main road ran south to the towns of eastern Jutland/Schleswig Haderslev, Aabenraa, Flensburg and the town of Schleswig. A much-used public road ran from Haderslev to the ferry at Årøsund, which was another popular ferry route between Jutland and Funen, and from the town of Aabenraa a road ran east towards the ferry at Sundeved, which sailed to the town of Sønderborg on the island of Als. East-west roads connected Kolding, Haderslev and Aabenraa to the towns in the west, in particular the town of Ribe but also Tønder close to the modern boarder between Denmark and Germany. The towns of Flensburg and Schleswig, where both traffic junctions in the road networks in these parts of modern Germany.³⁴

Funen

The island of Funen is located between the peninsula of Jutland to the west and the larger island of Zealand to the east. Several minor islands are located to the south of Funen, and to the north is the sea of Kattegat. Since the Viking age the town of Odense, which is situated in the northern

³³ The digitising of roads in the central parts of Jutland is based on 66 concept-maps. In addition to the concept-maps a variety of scholarly works have also been included, some of the most used works are: H. Matthiessen, *Hærvejen*, (1930); H. Matthiessen, *Viborg-Veje*; P. Enemark, *Dansk oksehandel 1450-1550. Fra efterårsmarkeder til forårsdrivning, vol. 1* (Aarhus, 2003), pp. 367-399; P. G. Møller & N. Haue, "Road network", *From Central Space to Urban Place Urbanisation processes in Viking Age and Medieval Odense and Aalborg, Denmark*, Mads Runge, Malene Refshauge Beck, Mikael Manøe Bjerregaard & Torben Birk Sarauw (eds.), (Odense, 2021), pp. 50-68.

³⁴ In total 53 of the Royal Academy's concept-maps were used to digitise the public road network in these parts of Jutland and Schleswig. The maps were supplemented by various research studies, some examples are H. Matthiessen, *Hærvejen*; H. Becker-Christensen, *Hærvejen i Sønderjylland*, (Vojens, 1981); P. Enemark, *Dansk oksehandel 1450-1550*.

centre of Funen, has been the political, commercial and traffic centre on Funen. From Odense the main roads led to several coastal towns from which ferries connected to Jutland via the towns of Middelfart and Assens and the harbour of Bøjden, and to Zealand via the town of Nyborg. Ferries in the town of Svendborg connected Funen to minor islands to the south (Ærø, Tåsinge and Langeland). The east-west connection across Funen which via Odense connected the important ferries in Middelfart in the west and Nyborg in the east was one of the most important routes in Denmark as it connected Jutland and the eastern regions in the kingdom. In the late medieval period, the ferry in the town of Assens south of Middelfart became to the Danish export of oxen from Funen.³⁵

Zealand

Moving further east to the island of Zealand, the east-west route known from Funen continued across this island. A public main road began in the ferry town of Korsør, and continued eastwards through the towns of central Zealand. The first town was Slagelse, which was a traffic junction on western Zealand, and continued towards Sorø, which was given town privileges before 1638, and from there to the town of Ringsted, which was a junction to all traffic on central Zealand.³⁶ From Ringsted the road from Korsør turned northeast to the town of Roskilde, home to the bishops of Zealand, and from there it went on to Copenhagen, which in the 15th century became the capital of Denmark. Probably already in the 12th or at least the 13th century a stable ferry route connected Copenhagen with the town of Malmö in Scania. From the 15th century onwards Copenhagen and Malmö were the two largest towns in Denmark, but Copenhagen had a unique status due to its status as capital.³⁷ From Copenhagen public main roads ran along to coast to the town of Helsingør in the northeastern corner of Zealand, and to Køge south of Copenhagen. A ferry route between Helsingør and Helsingborg in Scania was mentioned for the first time in the late 11th century.

³⁵ Totally, 13 concept-maps of The Royal Danish Academy were used to digitise the public main roads on Funen. The maps were supplemented by several studies of the historical roads on the island, for example: E. Porsmose, "Veje, færger og sejlruiter", *Atlas over Fyns kyst i jernalder, vikingetid og middelalder*, Ole Crumlin-Pedersen, Erland Porsmose & Henrik Trane (eds.), (Odense, 1996), pp. 201-203; P. G. Møller & N. Haue, "Road network", *From Central Space to Urban Place Urbanisation processes in Viking Age and Medieval Odense and Aalborg, Denmark*, Mads Runge, Malene Refshauge Beck, Mikael Manøe Bjerregaard & Torben Birk Sarauw (eds.), (Odense, 2021), pp. 50-68.

³⁶ A. Wittendorff, *Alvej og kongevej*; S. B. Böcher, "Træk a vejudviklingen i Danmark belyst gennem beliggenheden af vigtige vadesteder og broer", *Geografisk Tidsskrift* 65, (1966), pp. 129-176.

³⁷ H. Kristensen & B. Poulsen, *Danmarks byer i middelalderen*, (2016).

From Korsør it was also possible to follow a public main road north along Zealand's western coast towards the town of Kalundborg, which was connected to Aarhus in Jutland by ferry (see below). From Kalundborg a eastern road ran inland before it spilt into two sections. One section turned north to the small town of Nykøbing Sjælland, another continued towards Holbæk and Roskilde. A road led from Nykøbing Sjælland led to the ferry across the outlet of Isefjorden at Rørvig in northern Zealand. From Korsør it was also possible to travel south along public main roads, which led to the important towns of Næstved and Vordingborg. The latter was probably already in the 13th century connected to the island of Falster by ferries.³⁸

Lolland and Falster

In the western end of the island of Lolland a ferry located at the settlement of Tårs connected Lolland with the island of Langeland southwest of Funen. From here a public main road led travellers to the town of Nakskov, where the road split in two. One road turned south towards the town of Rødby, which was connected to several German ports by ferries. After Rødby the road continued further east to the town of Nysted, where the road ran northwards to the ferry in Sundby on eastern Lolland, which connected Lolland with the town of Nykøbing on the island of Falster. Another public main road on Lolland ran northeast from Nakskov and soon split in two: one along the northern coast of Lolland and one in the middle of the island. The road along the northern coast led to the settlement of Bandholm, which functioned as harbour for the town of Maribo and from 1632 also a toll station. In Bandholm travellers could either go south to the town of Maribo or continued eastwards to the town of Sakskøbing, where a road ran southwards to the ferry in Sundby. The road from Nakskov on the middle of the island led directly to Maribo, which in the medieval period housed a Brigittine monastery, and both before and after the Danish Reformation in 1536 was one of the most important market towns on Lolland. Due to its inland location on the middle of Lolland, Maribo functioned as junction in the road network on Lolland. From Maribo roads ran both north towards Sakskøbing and south towards Rødby.³⁹

³⁸ A total of 21 concept-maps constituted the central element of the digitalisation of the public main roads on the island of Zealand. The maps were supplemented by various studies of the island's historical road network. Especially, the works of Alex Wittendorf has been an important source of information, see A. Wittendorf, *Alvej og kongevej*, pp. 208-243.

³⁹ In total, nine concept-maps were used to digitalise the public main roads on the islands of Lolland and Falster. Again, the maps were supplemented by research on the historical road network in these parts of Denmark, for example J. T. Lundbye, "Vejenes udviklingshistorie på Lolland of Falster", *Årbog for Historisk Samfund for Lolland-Falster*, (1920), pp. 1-16.

A ferry across the narrow strait of Guldborg Sund connected Sundby on Lolland with the town of Nykøbing on the neighbouring island of Falster. Nykøbing was the junction in the road network on Falster. One road ran southwards from Nykøbing to the settlement of Gedser, which was connected to ports in Germany by ferries. From Nykøbing it was also possible to travel inland on Falster, where two public main roads ran to the north to either the town of Stubbekøbing or the ferry to the island of Møn, which was located near the settlement of Grønsund. Nykøbing was also connected to the ferry at Gåbense in the northwestern corner of Falster, which connected the island to the town of Vordingborg on Zealand.

Scania

As mentioned above, the Swedish provinces of Scania, Halland and Blekinge were part of the Kingdom of Denmark until the middle of the 17th century, and therefore these parts of modern Sweden are also to a certain extent included in the Danish Viabundus sub-project. However, so far it has only been possible to digitise the road network in the province of Scania. As the maps of The Royal Danish Academy of Sciences and Letters were produced more than a century after Scania, Halland and Bleking became Swedish, these regions were not covered by the mapping done by The Royal Danish Academy. Luckily, several Swedish maps from the 17th and 18th century are available from the Swedish National Archives (*Riksarkivet*) and from the Land Survey Board Archive (*Landmäterietstyrelsens Arkiv*).

As most of the towns in Scania were located along the coast, some of the most used public main roads also followed the coast. In north-western Scania one of the most used ferry routes between Zealand and Scania was located in the town of Helsingborg. From Helsingborg roads ran both inland to the town of Lund and to the north towards the province of Halland and passed through minor towns in the north-western corner of Scania. A public main road also followed the coast down to the town of Landskrona and further south the important town of Malmö, which in the late medieval period and early modern era was one of the largest towns in Denmark. From Malmö it was possible to reach Copenhagen by ferries or to follow several roads inland, for example to the town of Lund, which was the episcopal see of the church province of Denmark from 1103/04 until the reformation in 1536. Thus, Lund was a political and economic centre in medieval Denmark, although it lost terrain to Malmö during the late medieval period. Due to its historical importance and central inland locality Lund was an important junction to traffic in Scania. From Malmö it was also possible to travel southwards to the important herring markets in Falsterbo and Skanør. The same main road continued

toward the west along Scania's southern coastline, where is passed the towns and Trelleborg and Ystad before it ended in Simrishamn, a town in the south-eastern corner of Scania. From here a public main road ran to the north along Scania's eastern coast to the town of Åhus, from where travellers could continue to the province of Blekinge.⁴⁰

Node descriptions in the Danish dataset

As other Viabundus subprojects the work with the database within Viabundus Denmark has mainly been concerned with collection of general data on places of relevance to movement of people and goods (*nodes*). There are a couple of special features in the data produced by the Danish subproject which are relevant to emphasise in this context. One general special feature is the dynamic character of the dataset, which of course is a fundamental feature for all Viabundus data, but especially for the Danish subproject. In Viabundus version 1.2. the Danish dataset includes around 1000 nodes. In this context it is relevant to notice how the number of nodes is still growing. As the ongoing work progresses it is, for example, expected that the number of fairs and bridges will be higher, as these localities have not yet been registered in certain parts of the medieval Danish realm (see below). This is a consequence of a general lack of relevant Danish research, as several of the attributes ascribed to nodes in the Viabundus dataset have not been subject to comprehensive studies in Denmark. This is especially the case with the many fairs and ferries, which were scattered across medieval and early modern Denmark. In the same manner staple privileges have not been subject to much Danish research. Thus, information on fairs, ferries and staple towns has either been taken from primary sources or in numerous secondary works, which either are focused on a specific region or on a specific town. This has been a very time-consuming process, and therefore only the most important fairs, ferries and staple towns have been registered in Viabundus version 1.2.

There are also several other special features with the Danish data. These are unfolded in the following introductions to the descriptions of the different nodes created in the Danish subproject. Beside this, the aim of the introductions below is to explain some of the central

⁴⁰ For the digitization of roads in the provinces of Scania, a map that is comparable with the maps of The Royal Danish Academy of Sciences and Letters by level of detail and date of production was chosen. The map is from 1712 and was done by surveyor Johan Bosson Kempenskiöld (1674-1716). The map has some geometric distortions, but roads correlate well with later maps. No further investigation of the validity and quality of roads in Scania have been completed as part of Viabundus version 1.1 or version 1.2. Kempenskiöld's map is available at: <https://historiskakartor.lantmateriet.se/> (August 2022).

methodological approaches to the descriptions of nodes. Finally, the introductions also contain basic presentations of the most important research used for the different types of nodes.

Names

All the place names of the various nodes in the Danish dataset are written in their modern forms. In these areas which are still a part of Denmark modern Danish place names have been used, and in former Danish regions in either modern Germany or Sweden, the modern German or Swedish place names have been preferred. Historical or alternative names of nodes (especially villages and towns) have been located in several secondary works, especially the fifth edition of *Trap Danmark* (a statistical-topographic description of the Danish kingdom) and the database *Danmarks Stednavne* (The Place Names of Denmark) developed by researchers at University of Copenhagen, Department of Nordic Studies and Linguistics.⁴¹

Settlements

More than 500 nodes have been registered as settlements in the Danish realm in Viabundus version 1.2. Most of these nodes are villages. The Danish settlement structure in form of villages was well established before the medieval period, but the exact time of foundation for a specific village is extremely difficult to determine. Therefore, the time of foundation of villages in Viabundus Denmark is based on the foundation of the first parish church built in stone. As the first generation of Danish stone churches are from the Romanesque period in the 12th and 13th century, the foundation of the parish churches and villages in the dataset is normally set to the year 1200. The already mentioned fifth edition of *Trap Danmark* has formed the basis of the descriptions of villages in Viabundus Denmark.

Towns

During the medieval period, the kingdom of Denmark experienced an urbanization process: in the late Viking Age around the end of the first millennium, the number of towns in Denmark was very limited, but 500 years later at the end of the Middle Ages, towns could be found almost anywhere in the Danish realm. During the medieval period, Denmark became the most urbanized part of Scandinavia, as the Danish kingdom had more towns than the kingdoms of Norway and Sweden combined. However, the towns of medieval and early modern Denmark were small, especially compared to other and more urbanized parts of Europe such as England,

⁴¹ https://nors.ku.dk/publikationer/trykte_serier/danmarks_stednavne/. [August 2022].

Flanders, and Northern Italy. Most of the Danish towns had less than 1000 permanent inhabitants, and many only a few hundred. Still, these small urban communities were considered as towns, and were granted town privileges during the medieval period.⁴²

In total, 97 nodes within the Danish realm have been registered as towns in Viabundus version 1.2. The level of information in the descriptions of nodes in the Danish data is in general identical to the descriptions in other Viabundus subprojects. However, the town descriptions in the Danish dataset are in general longer, and therefore contain more information about features which reflect the urban character of settlements, although town privileges are not known before much later. Examples of such urban features are the first uses of town seals, the first known town hall and the foundation of urban monasteries by monastic orders such as the Franciscans and Dominicans. The descriptions of towns have in general been based on three different works on Danish medieval urban history, which all have been central to the Danish Viabundus subproject: 1) *Den urbana scenen: städer och samhälle i det medeltida Danmark* (1985) by the Swedish archaeologist Anders Andréén.⁴³ 2) *Danmarks Middelalderlige Byplaner*, which was published in seven volumes by the historian Jørgen Elsøe Jensen in the 1990s.⁴⁴ 3) *Danmarks byer i middelalderen* by Hans Krongaard-Kristensen and Bjørn Poulsen (2016). Combined, these three works have formed the basis for not only the town descriptions, but also other relevant features of various urban communities (or attributes) such as harbours, toll stations and ferries (see below). The three central works have been supplemented with other secondary works on the history of individual towns, is especially for larger towns such as Aalborg, Ribe, Aarhus and Copenhagen.⁴⁵

Tolls

Due to the character of the preserved written material, our knowledge of the character of tolls as well as toll stations in Denmark within the period in focus is relatively limited. Thus, only

⁴² K. H. Andersen, J. B. Netterstrøm, L. M. Imer, B. Poulsen & R. S. Olesen, "Introduction", *Urban Literacy in the Nordic Middle Ages*, K. H. Andersen, J. B. Netterstrøm, L. M. Imer, B. Poulsen & R. S. Olesen (eds.), (Turnhout 2021), pp. 1-38.

⁴³ A. Andréén, *Den urbana scenen. Städer och samhälle i det medeltida Danmark*, (Malmö, 1985).

⁴⁴ J. E. Jensen, *Danmarks middelalderlige byplaner*, 7. vols. (Odense, 1992-1999).

⁴⁵ E. Johansen, B. M. Knudsen & J. Kock, *Fra Aalborgs fødsel til Grevens Fejde 1534. Aalborgs historie I*, (Aalborg, 1992); S. B. Christensen (ed.), *Ribe Bys Historie bd. 1 710-1520* (Esbjerg, 2010); J. Linaa, *Urban Consumption. Tracing urbanity in the archaeological record of Aarhus c. AD 800-1800*, (Højbjerg, 2016); H. Dahlström, B. Poulsen & J. Olsen, "A Port on the Øresund: Initiatives and Dynamics in the Early Life History of Copenhagen", *Journal of Urban Archaeology* vol. 2 (2020), pp. 51-68. Another important source of information to the general history of towns and urbanity in Denmark in the early modern era has been O. Degn, *Fremgang, krise og stillstand. De danske byers historie 1536-1720*, (København, 2018).

35 Danish toll stations have been included in the Danish dataset. Among these are the most important royal toll stations such as the towns of Kolding in Jutland and Faaborg on Funen, while less important and more uncertain toll stations have been left out of Viabundus version 1.2. The standard work about the history of toll in Denmark in the medieval period and early modern era is *Dansk Toldhistorie I. Fra åretold til toldetat. Middelalderen indtil 1660* (1987) written by the historian Mikael Venge. In addition to Venges work the Viabundus dataset is also based on a broad spectrum of economic historical studies carried out by scholars such as Bjørn Poulsen, Poul Enemark and Thelam Jexlev.⁴⁶

Staples

The research on staple privileges in medieval and early modern Denmark is very limited. One of the reasons for this may be that towns with staple rights apparently were not as common in Denmark as in other parts of northern Europe covered by the Viabundus project. Thus, only seven Danish staple towns have been registered in Viabundus version 1.2. Among the well-known staple towns were the town of Assens on the island of Funen and the towns of Ribe and Kolding in Jutland, three towns which each played an important role in the export of oxen, and their staple rights were also related to the oxen trade. The information on Danish staple towns and stable privileges have been located in a selection of works. Again, *Danmarks byer i middelalderen* by Kristensen and Poulsen (2016) has been a valuable secondary source and has been supplemented by other secondary works on either specific regions or towns, which also touched upon staple rights.⁴⁷

Fairs

Except for the annual fairs of Scania (see below), which played an important role in the trade across Northern Europe, the phenomenon of annual fairs has not been the subject of much scholarly attention in Denmark. A thorough and well-researched overview of the Danish fairs does not exist, and therefore the Viabundus dataset about the fairs of late medieval and early modern Denmark is based on a variety of secondary sources. A very useful source has been the database *By og Opland*, which is developed and hosted by the Danish Centre for Urban History

⁴⁶ P. Enemark, *Dansk oksehandel 1450-1550. Fra efterårsmarkeder til forårsdrivning, vol. 1* (Aarhus, 2003); T. Jexlev "Middelalderlige toldregnskaber: en oversigt over de bevarede toldregnskaber frem til 1559, *Zise: told- og skatthehistorisk årbog*, vol. 1 1985, pp. 21-37.

⁴⁷ S. Pajung, *Coasts, Commerce, Contacts and Cultural Exchange. A study of the existence of coastal regions c. 1400-1650*, (Roskilde University, 2010). [Unpublished PhD dissertation].

and accessible at the website *Den Digitale Byport*.⁴⁸ The database is focused on the period from roughly the early modern era up until the late 19th century, but in the dataset one often also finds various information on the medieval origin of annual fairs. Roughly the same period was also covered by the historian Ole Degn in his study of annual fairs as regional centres.⁴⁹ In total, 63 annual fairs across the Danish realm have been registered in Viabundus version 1.2. There can, however, be no doubt that the total number of fairs was higher, and more fairs could have been included. However, those fairs that were not included in the dataset only had a local character and are in most cases only known because they at some point during the last part of the medieval period or in the early modern era were relocated from villages or parish churches to a privileged town within the same region. One example from the island of Lolland shows how the fairs previously held at the villages of Saltvig and Halste were abolished in 1646, and instead a new fair was established in the town of Nakskov. All fairs of either an international or regional importance have been included in the dataset. Among these are the herring fairs of Scania, which was amongst the most important annual fairs in northern Europe in the late medieval period.



The most important annual fairs in Denmark c. 1500. As several of the different nodes in the Viabundus dataset such as bridges, ferries and fairs have not been subjects of much scholarly attention in Denmark no thorough and well-researched overviews of these types of nodes are available. Thus, Viabundus Denmark represent the first attempt to register the most important medieval and early modern fairs in the Danish kingdom.

⁴⁸ The database *By og opland*: <http://ddb.byhistorie.dk/privilegier/> [August 2022].

⁴⁹ O. Degn, "Fairs as periodical regional centres in Denmark, 1600-1900", *Regional Integration in Early Modern Scandinavia*, Finn-Einar Eliassen, Jørgen Mikkelsen & Bjørn Poulsen (eds.), (Odense, 2001), pp. 140-161.

A particular important aspect of the history of annual fairs in the period c. 1350-1650 is the annual fairs in the region of Scania. Several towns along the coast of Scania were partly established due to the rich fishing of herring during autumn in these parts of the Baltic Sea, especially in the narrow strait of Øresund between Scania and Zealand. The annual fairs of Scania began at Falsterbo and Skanör on a small peninsula in Øresund during the early medieval period and soon spread to towns along the coast of Scania such as Landskrona, Malmö, Trelleborg and Ystad. Also, towns on the western side of Øresund such as Dragør and Stege played an important role in the fishing and trading activities, which began in the middle of August and ended in early October. The rich fishing of herring each autumn attracted people and trade to the region. During the 14th century the trading activities grew in importance, and the fairs of Scania developed into one of the most important of the international markets in Northern Europe, during the 16th century, however, the Scania fairs began to decline.

Bridges

In total, 79 medieval or early modern bridges are included in Viabundus version 1.2. It is, however, important to notice that the number will be significantly higher in forthcoming versions of the dataset, as the bridges located in the regions of Scania, Halland and Blekinge are not yet included in the dataset. Also, on the island of Funen only a few bridges have been registered in Viabundus version 1.2. Amongst these is the important bridge of Åsum. Information on the bridges of medieval and early modern Denmark has also been found in a broad variety of both primary and especially secondary literature. An important and very rich study of historical fords and bridges across Denmark was conducted by the geographer Steen B. Böcher.⁵⁰ Kirsten-Elizabeth Høgsbro has also studied the medieval and early modern bridges with a national perspective.⁵¹ Other important secondary sources, which in general are more accurate when it comes to precise dating of individual bridges, are in general focused on specific parts of Denmark. In the case of Jutland, the already mentioned studies of Hugo Matthiessen and Poul Enemark also contain much information on bridges and fords - especially in central Jutland. And on the island of Zealand Alex Wittendorff's *Alvej og kongvej* has been a very important source.

⁵⁰ S. B. Böcher, "Træk af vejudviklingen i Danmark belyst gennem beliggenheden af vigtige vadesteder og broer", *Geografisk Tidsskrift* bd. 65 (1966), pp. 129-176.

⁵¹ K. E. Høgsbro, "Historiske broer – magtens symbol", *Turistårbogen 1984* (1984), pp. 38-64.

Ferries

Ferries played an essential role in the infrastructure of medieval and early modern Denmark. They were the only way to cross the straits between the different provinces as well as numerous inland fjords within the different provinces, especially in Jutland. The exact character, age and date of the many different ferries is, however, very difficult to define. One of the most important ferry routes connected Jutland and Zealand. In Jutland the ferry departed from the town of Aarhus and on the island of Zealand the ferry departed from the town of Kalundborg. Apparently, this ferry route across the sea of Kattegat was first mentioned by the German chronicler Adam of Bremen in the 1070s, and from the medieval period on, it has remained a central part of the Danish infrastructure. Up until the modern time at least some of the ferries between Aarhus and Kalundborg crossed Kattegat via the island of Samsø. It was also possible to cross directly without a stop on Samsø. Some of the other ferry routes of national importance were: Sundby-Aalborg (across Limfjorden), Snoghøj-Middelfart (across Lillebælt), Korsør-Nyborg (across Storebælt) and Copenhagen-Malmö (across Øresund). Viabundus version 1.2. includes 83 ferries in the Danish realm. The existing research is limited, and a thorough study of the role of ferries within the Danish kingdom has not yet been carried out. Thus, information about ferries has been gathered in various publications. Alex Wittendorf has registered some of the ferries in medieval and early modern Denmark,⁵² and some of the standard works on Danish maritime history also contains information on ferries.⁵³

Harbours

As most towns of Denmark were placed either directly by the sea, by a fjord or stream which gave them direct access to the sea, they all had a harbour. Even inland towns such as Holstebro and Viborg in Jutland had access to maritime trade by harbours which were located at the nearest coastline. The harbour of Holstebro, for example, was located at Struer, which much later developed into a town, in the western part of Limfjorden. Minor and often illegal harbours, which were not attached to towns, could also be found along many Danish coastlines, but these are in general not included in the dataset. In total, 81 harbours are included in Viabundus

⁵² A. Wittendorff, "Færgesteder og færgekroer gennem tiderne", *Turistårbogen 1984* (1984), pp. 12-37.

⁵³ J. Bill, B. Poulsen, F. Rieck & O. Ventegodt, *Dansk søfartshistorie I. Indtil 1588. Fra stammebåd til skib*, (København 1997); B. Poulsen, "Vikingetidens og middelalderens søfart 800-1600", *Sønderjysk søfarts historie I. Før 1814*, Mikkel Leth Jespersen & Hans Schultz Hansen (eds.), (Aabenraa 2021), pp. 89-152; M. Guldborg, "Skibe i øst, søfolk i vest 1600-1814", *Sønderjysk søfarts historie I. Før 1814*, Mikkel Leth Jespersen & Hans Schultz Hansen (eds.), (Aabenraa 2021), pp. 153-332.

version 1.2. Also, in this case it must be expected that the number will be higher in future versions of Viabundus. The description of harbours is first and foremost based on *Danmarks byer i middelalderen* by Hans Krongaard Kristensen and Bjørn Poulsen and *Danmarks middelalderlige byplaner* by Jørgen Elsø Jensen.

Locks

No locks have been registered in the Danish Viabundus dataset version 1.1 or 1.2, as no locks have been found in neither the secondary nor primary sources.

Credits

Viabundus Denmark was created by

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