Digital maps go vertical: TomTom/Tele Atlas and Nokia/NAVTEQ

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The Commission recently issued decisions in two vertical merger cases in the satellite navigation industry. In October 2007, TomTom notified the Commission of its acquisition of Tele Atlas. Four months later Nokia notified its acquisition of NAVTEQ. Both of these cases are important from a policy point of view. TomTom/Tele Atlas and Nokia/NAVTEQ are the first purely vertical second phase investigations after the adoption of the non-horizontal merger guidelines. They provide guidance on how the Commission is going to apply the non-horizontal merger guidelines in future cases, in particular in situations where there is a duopoly upstream and where both upstream players integrate vertically in a short period.

I — Digital map suppliers went for vertical integration simultaneously

Transactions

On 22 October 2007, TomTom N.V. ('TomTom', the Netherlands) notified the Commission of its acquisition of Tele Atlas N.V. ('Tele Atlas', the Netherlands) ([2]). A few months later, on 19 February 2008, Nokia Corporation ('Nokia', Finland) notified the Commission of its acquisition of Navteq Corporation ('NAVTEQ', USA) ([3]).

The **two transactions** were put together almost simultaneously. They resulted in the vertical integration of the navigable digital map providers Tele Atlas and NAVTEQ. Both purchasers, TomTom and Nokia, embed digital maps in the devices they manufacture in order to provide their customers with navigation solutions.

Tele Atlas and NAVTEQ are providers of navigable digital maps. They supply manufacturers of PNDs (Portable Navigation Devices), car manufacturers, navigation software producers, mobile handset manufacturers and location web companies (for instance, Google Maps) with the digital maps they need to operate navigation solutions. Other digital map suppliers are active on the market, but their product lines are not comparable to Tele Atlas or NAVTEQ's. They are not in a position, in particular, to provide similar geographic coverage and cannot offer sufficient functionalities, resulting in digital maps that are unsuitable for advanced navigation functions such as car navigation.

TomTom is a manufacturer of PNDs and a supplier of navigation software for use in navigation devices. It is the European leader in the PND market, way ahead of its competitors, Garmin, Mio Tech & Navman. Its activities as a supplier of navigation software to third parties are limited.

Nokia provides equipment, solutions and services for electronic communications networks. The company is principally known as a manufacturer of handsets for mobile telephony ('mobile handsets'). It also intends to develop mobile online services via its 'OVI' portal. Nokia is the world's largest supplier of mobile handsets, its main competitors being Motorola, Samsung and Sony Ericsson. The share of mobile handsets to incorporate navigation possibilities via the inclusion of a GPS chipset is expected to increase dramatically in the short term, and to account for considerably more than 50% of the mobile handset market within a few years.

Vertically affected markets

A digital map is a compilation of digital data and typically includes (i) geographic information containing the position and shape of each feature on a map, (ii) attributes containing additional information associated with features on the map (e.g. street names, addresses, driving directions, turn restrictions and speed limits) and (iii) display information. In addition to the core database, several layers of add-on information are provided by the suppliers of digital map databases. Maps are said to be navigable when they include sufficient functionalities to provide navigation services, such as real-time turn-by-turn navigation.

In both cases, the Commission considered the relevant upstream market to be the market for navigable digital map databases, where only Tele Atlas and Navteq are active, with market shares of approximately 50% each. Navigable digital map databases are one of the key structural components of dedicated navigation devices and other navigation applications. The relevant geographic

([1]) Directorate-General for Competition, unit C-5. The content of this article does not necessarily reflect the official position of the European Commission. Responsibility for the information and views expressed lies entirely with the authors.
([2]) COMP M.4854 *TomTom/Tele Atlas*.
([3]) COMP M.4942 *Nokia/Navteq*.

market for the provision of navigable digital map databases was considered to be worldwide since geographic data can be sold to customers anywhere around the world and the transportation costs and other barriers to trade are minimal. The Commission also established that entry in this market was unlikely in the short- to mid-term.

In the *TomTom/Tele Atlas* case, the downstream markets affected were the market for PNDs and the market for the provision of navigation software. This type of navigation software can be sold to PND manufacturers, but also to mobile handset manufacturers, Mobile Network Operators (MNOs), or directly to end-customers for self-installation in their mobile handsets.

In the *Nokia/NAVTEQ* case, the downstream markets affected were the market for mobile handsets, and the market for the provision of navigation applications on mobile handsets (including on-board, off-board and hybrid solutions).

In both cases, PNDs and mobile phones with GPS were not considered to be part of the same product market. The market investigation revealed that there are significant differences between the two types of devices. Whereas the latest mobile phones are ultra-portable multi-function communication devices, PNDs are primarily designed for navigation. This is reflected in the larger screen sizes of PNDs and the fact that, with some exceptions, they do not offer the wide range of functions common in most smart phones. Consumers use mobile phones mostly for communication and PNDs mostly for navigation. However, the Commission did not exclude that, as technology evolves, both markets will increasingly converge.

II — Assessment of vertical foreclosure theory

Theory of vertical foreclosure

In both cases, the merger led to the vertical integration of one of the two suppliers of navigable digital maps to the downstream competitors of the purchaser. Both transactions therefore raised potential concerns of input foreclosure. Nevertheless, the two transactions had only a limited impact on each other in terms of competitive assessment, as TomTom and Nokia are essentially active in different downstream markets.

The theory of harm raised under *Tom Tom/Tele* Atlas was that the merged entity could foreclose its downstream competitors in the PND market and in the navigation software market, either via an increase in the price of its navigable digital maps, via a degradation of the map quality or via total foreclosure. Such strategies would strengthen the market power of the other supplier of navigable digital maps, namely NAVTEQ, which would, as a result, be likely to increase its prices. The theory of harm raised under *Nokia/NAVTEQ* was similar. The Commission found that the merged entity could attempt to foreclose its downstream competitors in the mobile handset market and in the market for the provision of navigation applications on mobile handsets.

In both cases, the theory of harm relied on the increase in market power of the remaining supplier of navigable digital maps, which was not party to the transaction, and its capacity to increase its prices. The Commission's assessment of the likelihood that such a theory of harm would materialise was based on the Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings ('the non-horizontal merger guidelines'). The Commission analysed the ability and in particular the incentive of the merged entities to foreclose their downstream competitors, as well as the overall effect in downstream markets.

Assessment — lack of incentive

In *TomTom/Tele Atlas,* the Commission concluded that the merged entity would have the ability to increase prices or degrade quality/delay access for some PND manufacturers and navigation software providers competing with TomTom. This conclusion was based on the following factors: (i) navigable digital maps are an essential input for PNDs and navigation software; (ii) it is unlikely that a market entrant could produce navigable digital maps in the short term; and (iii) the foreclosure strategy by one digital map database supplier could increase the market power of the other.

Conversely, in *Nokia/NAVTEQ* the Commission did not reach any conclusion with regard to the ability of the merged entity to foreclose its downstream competitors, for instance because navigation applications in handsets are only one application among others (video, mobile TV, music, design, etc.) and therefore constitute only one of the numerous factors triggering the purchase reflex of customers. The question whether the merged entity has the ability to foreclose was therefore left open.

In both cases, the Commission concluded that the merged entities would not have the **incentive** to foreclose their downstream competitors. Post-merger, TomTom and Nokia will look at how the sales of map databases to their downstream competitors affect their profits not only upstream via

sales of Tele Atlas or NAVTEQ maps, but also on their respective downstream markets. Therefore, when considering the profitability of an input foreclosure strategy, the merged entities face a trade-off between the profit lost in the upstream market due to a reduction of input sales and the profit gained on their respective downstream markets by raising their rivals' costs.

The Commission conducted an in-depth qualitative and quantitative analysis ([4]) to assess the incentive of TomTom and Tele Atlas, and of Nokia and NAVTEQ, to foreclose their competitors in their respective downstream markets. The analysis led to the conclusion that, although the profits obtained by selling a PND (for TomTom) or a mobile handset (for Nokia) are much higher than the profits from the sale of a map database, neither merged entity would have the incentive to foreclose its downstream competitors.

In *Nokia/NAVTEQ,* for instance, the economic analysis conducted by the Commission concluded that, under a foreclosure strategy, the merged entity would only capture relatively limited sales downstream by increasing map database pricing to Nokia's competitors and the loss of revenue due to decreasing sales of map databases would not be replaced by additional sales of mobile handsets. A similar conclusion was reached in *Tom Tom/Tele Atlas* as regards limited additional sales of PNDs.

The Commission finally analysed the **effects of the merger in the downstream markets,** although it was not necessary as it had already concluded that the merging parties had no incentive to foreclose their competitors. In both cases, the Commission concluded that the effects would be relatively limited, in particular because the low percentage of the price of a map database in the PND or mobile handset prices, the evidence regarding limited pass-through, the limited switching costs and the competition with the other navigable digital map supplier all tended to limit the price increase that could be imposed by either Tele Atlas or NAVTEQ on their downstream competitors and eventually on consumers.

In addition, in *TomTom/Tele Atlas* the parties claimed that the transaction would bring about efficiencies. Whereas the Commission did not come to any conclusion on the merger specificity of the alleged efficiencies, which would allow the merged entity to make better maps in less time, it found that the alleged removal of double marginalisation was plausible and merger-specific.

Finally, the Commission declared both concentrations compatible with the Common Market and the EEA Agreement.

III — Impact on the application of the Non-horizontal Merger Guidelines

Both *TomTom/Tele Atlas* and *Nokia/NAVTEQ* have been examined by strict application of the non-horizontal merger guidelines. Point 29 of the non-horizontal merger guidelines formed the backbone of the theories of harm raised within the market investigations:

> 'A merger is said to result in foreclosure where actual or potential rivals' access to supplies or markets is hampered or eliminated as a result of the merger, thereby reducing these companies' ability and/or incentive to compete. Such foreclosure may discourage entry or expansion of rivals or encourage their exit. Foreclosure thus can be found even if the foreclosed rivals are not forced to exit the market: It is sufficient that the rivals are disadvantaged and consequently led to compete less effectively. Such foreclosure is regarded as anti-competitive where the merging companies — and, possibly, some of its competitors as well — are as a result able to profitably increase the price charged to consumers.'

An important aspect of the theory of harm was the existence of a duopoly in the market for digital map databases. The issue was therefore not only that downstream players could be foreclosed by the vertically integrated entity, but also that the market power of the remaining upstream player could be increased following the transaction. The non-horizontal merger guidelines indicate that, when competition in the input market is oligopolistic, a decision of the merged entity to restrict access to its inputs reduces the competitive pressure exercised on remaining input suppliers, which may allow them to raise the input price they charge to non-integrated downstream

([4]) In order to make an empirical assessment of whether an input foreclosure strategy would be profitable for the merged entity, the Commission conducted in each case an econometric demand system estimation of the relevant downstream market. In particular, a nested logit model was estimated using retail data covering monthly sales and volumes at stock-keeping unit level, and specific product characteristics were used as instruments to control for endogeneity. Using the estimated downstream own- and cross-price elasticities, together with industry data on prices and margins, the Commission then calculated in each case the critical price increase by the upstream competitor that would make a foreclosure strategy profitable for the merged entity. The Commission conducted numerous robustness checks in each case, concerning in particular the choice of instruments, the size of the outside good and the nest structure.

competitors ([5]). In essence, input foreclosure by the merged entity would expose its downstream rivals to non-vertically integrated suppliers with increased market power. For example, competitors of TomTom would have to buy from NAVTEQ, the only other supplier not integrated with a PND manufacturer.

In addition, in *TomTom/Tele Atlas* a number of third parties expressed a concern that the merged entity could use the confidential information obtained from the customers of the upstream map-making arm of the company to improve the competitive position of the downstream device-making arm. With regard to the question of confidentiality, the Commission based its findings on Point 78 of the non-horizontal merger guidelines, which addresses the issue of how access to confidential information could lead to competitive harm. *'The merged entity may, by vertically integrating, gain access to commercially sensitive information regarding the upstream or downstream activities of rivals. For instance, by becoming the supplier of a downstream competitor, a company may obtain critical information, which allows it to price less aggressively in the downstream market to the detriment of consumers [...]. It may also put competitors at a competitive disadvantage, thereby dissuading them to enter or expand in the market.'*

Companies contacted during the investigation indicated that they pass sensitive information on to Tele Atlas about their future conduct (prices, promotions, innovations), *inter alia*, in order to obtain better prices, ask for new map features or incorporate features developed by third parties, as well as to introduce innovative service concepts or penetrate new geographic markets.

The access by TomTom to confidential information supplied by customers to Tele Atlas may have two effects. On the one hand, TomTom will know what the competition is planning. This advance knowledge might allow it to compete less intensely. On the other hand, TomTom's competitors might choose not to purchase maps from their competitor. The merger might therefore significantly strengthen the market power of NAVTEQ, which would increase its ability to increase prices. As described in the following section, the Commission found that the merged entities in both cases would not have the incentive to degrade the quality of the product by, for example, leaking confidential information.

([5]) Non-Horizontal Merger Guidelines, Point 38.

Incentive — vertical foreclosure

In examining the likelihood of the theories of harm raised during the market investigation actually materialising, the Commission focused in particular on the incentive of the parties to foreclose their downstream competitors. It is of interest to analyse how the criteria set out in the non-horizontal merger guidelines in relation to the incentive to foreclose access to inputs were addressed, and what conclusions can be drawn for future cases in this respect.

Point 40 of the non-horizontal merger guidelines states:

> *'The incentive to foreclose depends on the degree to which foreclosure would be profitable. […]. Essentially, the merged entity faces a trade-off between the profit lost in the upstream market due to a reduction of input sales to […] rivals and the profit gain, […], from expanding sales […].*

The non-horizontal merger guidelines provide guidance in assessing the incentive that the merged entity may have to foreclose its downstream competitors, by pointing to the main factors affecting this trade-off. These factors are discussed below, together with their relevance to both cases.

1. Upstream and downstream margins — Point 41 — *'[…] the lower the margins upstream, the lower the loss from restricting input sales. Similarly, the higher the downstream margins, the higher the profit gain from increasing market share downstream'*. In both cases, the percentage gross margins are higher upstream than downstream, since digital maps have very low marginal costs. In absolute terms, however, the gross margin achieved when selling a PND or a mobile handset with navigation functionalities can be 10 to 20 times higher than the gross margin achieved on the sale of a map, since maps make up a small percentage of the price of the downstream products.
2. Downstream demand likely to be diverted away from foreclosed rivals — Point 42 — *'The incentive […] further depends on the extent to which downstream demand is likely to be diverted away from foreclosed rivals.'* This refers to the own-price elasticity of rivals' demand, which was estimated econometrically in both cases, but also to the extent to which the price of the rivals' downstream product is expected to increase if the merged entity were to adopt an input foreclosure strategy. The guidelines state that *'[t]he effect on downstream demand will also be higher if the affected input represents a significant proportion of downstream rivals' costs or if the affected input represents a*

critical component of the downstream product.' In both cases, maps make up a small portion of the downstream product price, which means that map prices would have to increase very substantially to have a significant impact on downstream demand. One difference between the two cases is that, while in TomTom/Tele Atlas navigable maps were considered to be a critical component of portable navigation devices, in Nokia/Navteq navigable maps were not considered to be a critical component for handsets. Indeed, navigable digital maps are needed for navigation applications, but mobile handsets can also be sold without such navigation applications and other features of the mobile handset are equally important (mobile TV, music, camera, etc.). Even in the TomTom/Tele Atlas case, however, given the presence of Navteq in the upstream market, a foreclosure strategy could only lead to an increase of the input price, which would be likely to have limited effects downstream given the small share of the input cost in the total price.

3. Share of diverted downstream demand likely to be captured by the merged entity. — Point 42 — The guidelines further state that *'[t]his share will normally be higher the less capacity constrained the merged entity will be relative to non-foreclosed downstream rivals and the more the products of the merged entity and foreclosed competitors are close substitutes.'* In both cases, capacity constraints would not limit the downstream sales that could be captured by the integrated companies. Indeed, both Tele Atlas and NAVTEQ develop and update an original version of their digital map, which can be duplicated without any technical, legal or price restriction. With this point in mind, the extent to which the merged entity would capture sales from its downstream rivals was estimated econometrically in both cases. In particular, it was found that, on the basis of the estimated cross-price elasticities, the integrated companies would gain relatively limited sales from their downstream competitors by increasing their map prices.

4. Downstream market share — Point 43 — *'The incentive to foreclose actual or potential rivals may also depend on the extent to which the downstream division of the integrated firm can be expected to benefit from higher price levels downstream as a result of a strategy to raise rivals' costs. The greater the market shares of the merged entity downstream, the greater the base of sales on which to enjoy increased margins'*. In both cases, the merged entities have large market shares on their respective downstream markets. Indeed, TomTom is the leader on the PND market in Europe, far ahead of Garmin. Similarly, Nokia is the world leader in the market for mobile handsets, far ahead of Motorola.

It is remarkable to observe that, in both cases, several of the issues discussed above tend to make the incentive to foreclose more likely. However, a mere checklist interpretation of the guidelines would not be productive, as some factors invariably make the incentive to foreclose more likely while others make it less likely. Instead of relying on a checklist, the Commission therefore conducted a detailed empirical assessment of the profit trade-off described in the guidelines, and concluded that in both cases the parties would not have the incentive to foreclose their downstream competitors. In *Nokia/NAVTEQ,* for instance, the Commission estimated that a foreclosure strategy could only be profitable for the merged entity if Tele Atlas increased its prices by more than 200% as a result. Such a price increase was found to be unrealistic, and in addition NAVTEQ may have an economic interest to undercut Tele Atlas with price increases well below 200%. A similar conclusion was reached in the *TomTom/Tele Atlas* case. Key characteristics limiting the incentive to foreclose in both cases are the small percentage of the input cost with respect to the price of the downstream product, and the presence of a second input supplier in the upstream market that is not vertically integrated in the same downstream markets.

The decisions show the willingness of the Commission to examine all factors mentioned in the guidelines, pointing both to harm and to the absence of any harm. In both cases, the Commission concluded that, on balance, the merged entity would not have any incentive to foreclose its competitors. While the Commission would be likely to apply a similar analysis to other markets with comparable characteristics, it is important to keep in mind that each case is specific and therefore needs to be assessed on its own merits.