

# The Potential of VoIP Applications as a Source of Mobile Positioning Data for Providing Tourism Statistics

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**Abstract:** The promising potential of mobile positioning data as a tool for producing tourism statistics data are acknowledged by the experts of the subject.

However, the data supplied by GSM operators might not be as inclusive as they used to be in the beginning of 2000s anymore. We observe a steady decline in the “mobile phone roaming expenditures” item of tourism receipt data of Turkey during 2009-2012, which is inversely correlated with the rapidly increasing number of arriving foreign visitors and total tourism receipts. How can we explain this negative correlation?

Part of the answer clearly lies in the evolution of mobile phones as communication tools: Mobile phones once were devices that only worked over GSM systems; but today they are as versatile and powerful as the desktop computers of the previous decade. This, combined with the rapid development of Wi-fi networks around the world, allowed the tourists to make phone calls over VoIP applications such as Skype and Viber for free. In the near future we can expect the majority of the tourists to communicate via software of this kind to avoid roaming costs.

The aim of this paper is to discuss the importance, quality and characteristics of tourism related data that these VoIP mobile phone applications may provide. A new level of innovation can be introduced to the mobile phone positioning data in the context of tourism statistics within this framework.

**Key words:** Tourism statistics, mobile positioning, VoIP

## 1. Introduction

The need for innovative data collection techniques has been an important topic of tourism statistics recently. Traditional data collection techniques like face-to-face questionnaires are expensive, difficult to conduct and time consuming. Using new technologies as data sources and developing data collection methods within this context, aims to produce complete or supplementary data for tourism statistics. With the help of technology, data that could not be obtained otherwise (eg. detailed spatial data) can be collected for a lower cost.

Within this context, using the spatial data that GSM operators collect for monitoring tourist movements can be a true revolution in terms of producing tourism statistics. Czech Republic<sup>1</sup> and Estonia<sup>2</sup> are known to use this innovative method to monitor international tourist flow.

However; implementing these new methods of data collection has its own set of problems. Within the context of monitoring tourists through the data supplied by GSM operators, these problems were used to be the reliability & the consistency of the data, privacy issues and the difficulties that might arise while obtaining the data from external

sources<sup>3</sup>. Recently another problem, which might be far more important than the rest, arose: GSM is not the only mainstream way of making international calls.

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## **2. Voice-Over-IP Applications**

IP telephony or Voice over IP (VoIP) is the transmission of standard voice conversations (telephone-to-telephone) over packet-switched, IP-based data networks including private corporate LANs, WANs, Intranets, and the Internet<sup>4</sup>. In other words, VoIP systems are telephones that work can over computer network systems.

VoIP can be used as an alternative to traditional telephony. It can include connections that incorporate PCs, regular phones and smart mobile devices (smartphones, tablets, etc.)<sup>5</sup>.

Skype, Viber, Line, Tango, Google Hangouts, Google Voice, ooVoo are some well-known examples of free or partially free Voice-over-IP applications. These applications might work on desktop or mobile systems (such as smartphones). Some of them have the ability to perform calls to ordinary telephones registered by telephone operators.

### **2.1. The Skype example**

In this section, Skype, the leader of VoIP market will be inspected in detail to explain what VoIP systems bring into the international communication arena.

Skype is a free voice-over-IP and instant messaging application which was founded in 2003<sup>6</sup>. In the following years, it rapidly grew successful and became the industry leader. Following that success, Microsoft acquired Skype for \$8.5 billion on May 10th 2011<sup>7</sup>. This was considered as a risky investment since Skype had only \$800 million in sales when the acquisition took place. However, the suspicions were proved wrong and Skype division of Microsoft went up to \$2 billion in sales in 2013<sup>8</sup>. As of 2013, Skype users spent an average of 2 billion minutes per day to communicate with others<sup>9</sup>.

The sky-rocketing success of Skype can be explained with several reasons:

- It is completely free to make calls between Skype accounts using PCs and smart mobile devices.
- Traditional operators (telephones) can be called from Skype. These calls are paid but the rates are much lower.
- Large platform support (Windows, Mac, Linux, iOS, Android, etc.), which enables Skype to work on almost every device.
- Vast language support (over 30 locales and languages are bundled).
- Strong features (conference calls, video calls, instant messaging, etc.).
- Ease of use.

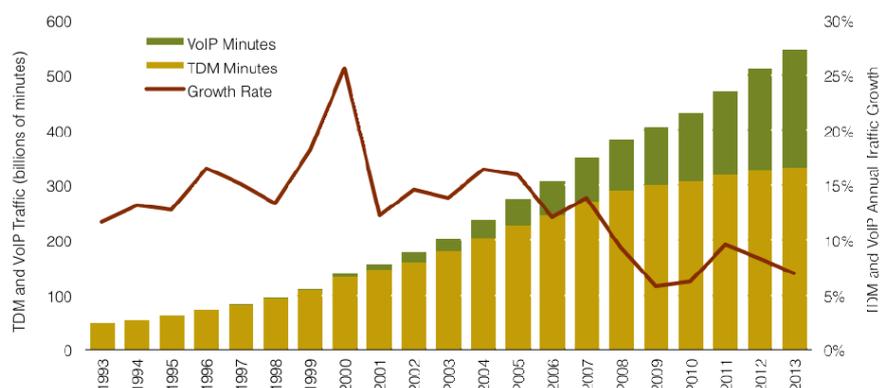
Giving the customers the chance to make international calls for free brought success for Skype. But the language and platform support offered with an easy-to-use interface made it last. Detailed research about the success of Skype has been made by several academics<sup>10</sup>.

### 3. The Share of VoIP in International Calls

#### 3.1. Global Data

Telecom market research firm TeleGeography has released a benchmark report of the international long-distance market which focuses on the international calls made in 2013. According to the report, the “Skype factor” has significantly decreased the international calls made via regular phone companies. The report also states that the international call traffic growth is slowing and the telephone companies must compete with software based computer and smartphone applications, such as Skype and Google Voice. The report states that the share of international carrier traffic routed as VoIP has grown from 11 percent in 2002 to 36 percent in 2013<sup>11</sup>.

**Figure I. International Call Volumes and Growth Rates, 1993-2013**

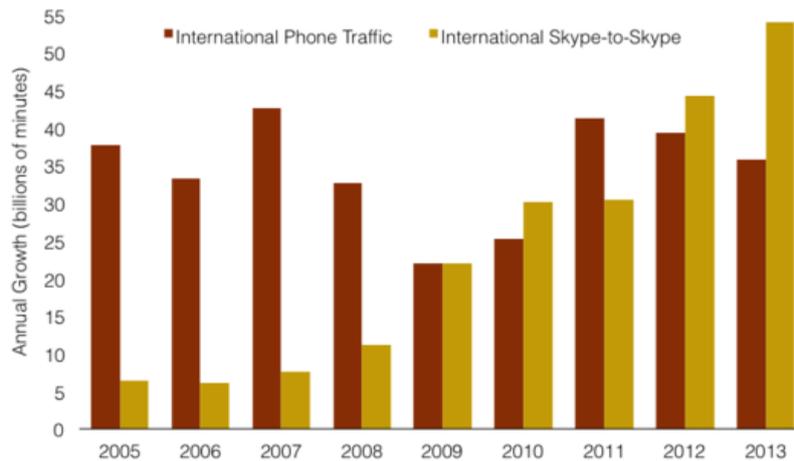


Notes: Data for 2013 are projections. VoIP traffic reflects international traffic transported as VoIP by carriers, and excludes PC-to-PC traffic.

In Figure I, the regular telephony is represented by TDM Minutes. The share of VoIP Minutes has seen a steady rise since the beginning of the 2000s. The share of VoIP Minutes in the total international calls became significantly large in 2013, which renders the TDM data inadequate to explain the complete picture of international call traffic.

In Figure II, where the annual international call traffic growth is shown, this trend is more obvious. The growth of Skype-to-Skype calls surpassed the growth of international phone traffic in 2012 and the gap increased significantly in 2013. Combined with the paid calls made from VoIP-to-Phone, VoIP applications can be expected to dominate the international telephone traffic in the near future.

**Figure II. Increase in International Phone and Skype Traffic, 2005-2013**



### 3.2. Turkey Data

Tourism receipts of Turkey are officially published by Turkstat (*Turkish Statistics Institution*). “Mobile Phone Roaming Expenditures” breakdown shows the amount of tourism receipts acquired from international tourists who used roaming GSM services in Turkey during the given years.

**Figure III. Tourism Income by Type of Expenditure, 2002-2013**

Period	Departing Foreigners	Tourism Income	Mobile Phone Roaming Expenditures
2002	12 921 982	12 420 519	86 576
2003	13 701 419	13 854 868	107 231
2004	17 202 996	17 076 609	144 839
2005	20 522 621	20 322 110	208 961
2006	19 275 948	18 593 950	182 443
2007	23 017 081	20 942 500	246 623
2008	26 431 124	25 415 067	348 443
2009	27 347 977	25 064 481	266 354
2010	28 510 852	24 930 996	220 332
2011	31 324 528	28 115 693	210 137
2012	31 655 188	29 007 003	196 079
2013	34 686 402	32 310 424	163 627

The data shown in Figure III shows a steady increase in the number of departing foreigners (foreign tourists) and tourism income (receipts). Mobile phone roaming expenditures followed the same trend until 2008, but started to decrease in 2009. Between 2009 and 2013, mobile phone roaming expenditures kept decreasing. The inverse proportion of the rising tourism indicators and decreasing mobile phone roaming expenditures can be interpreted as an indicator of the “VoIP effect”. Tourists seem to prefer VoIP over to regular international phone calls, because it is free and accessible.

In terms of international calls, rise in VoIP usage means decrease in GSM usage. In the near future we can expect VoIP to outpace GSM, which will lead us to the conclusion; **GSM data alone is not enough to measure international tourist movements**. If complete movements of the tourists are to be measured, VoIP data should be taken into account.

#### 4. The Potential of VoIP for Producing Tourism Statistics

VoIP applications can be expected to provide data to produce tourism statistics in a similar way the GSM operators do. Skype collects several information from users such as; identification data, profile information (gender, country of residence, language preference, etc.), traffic data and location information<sup>12</sup>. Viber<sup>13</sup>, ooVoo<sup>14</sup> and other VoIP applications also collect location information. Theoretically the location information collected can be used to produce tourist movements.

- The country of residence of the user can be determined through registration.
- If necessary, the usual environment of the tourist can be determined by analyzing previous data.
- Once the user leaves the country/usual environment, the application can gather positional and temporal data.
- Thus, this data set can be used to measure tourist movements.

Just like GSM data, collecting and using VoIP data might have its drawbacks. Coverage of the data, privacy issues, reliability of the data and ease of data collection are visibly the most important issues to be addressed.

##### Coverage of data:

The VoIP calls represent 36 percent of the whole international telephony market as of 2013<sup>11</sup>. The rest of the calls (64%), which are made via GSM, cannot be represented by this data alone. In the future, if the VoIP usage in international calls dominates the international telephony market via smart phones, the situation might change.

As a result VoIP data should be used as a supplementary data for the GSM data to represent the complete tourist population.

Privacy Issues:

Collecting GSM positional data to follow tourist movements might lead the users to raise concerns about becoming a part of surveillance society<sup>15</sup>.

The same concern also applies for VoIP applications. However, user control over the amount of data that will be transmitted is very common with smart device applications. Many applications ask the user if they allow their positional data to be transmitted to a service or application. Giving the user the option to decide can lower the privacy concerns. So, collecting VoIP data can be arguably easier than collecting GSM data in terms of privacy.

Reliability of data:

Most smart devices can transmit positional data and are used as navigation devices. Thus, VoIP applications working over smart devices also have the ability to transmit precise positional data.

Ease of Data Collection:

Collecting position data from several different GSM operators working all around the world can be difficult in terms of coordination.

VoIP service providers will have access to global data and will not be limited by borders in their data collection. So, establishing a common location database can be much easier if spatial and temporal data can be collected from few major VoIP application firms like Skype, Viber, Google and ooVoo.

### **3. Results and Discussion**

Tourist movements can be monitored by data related to international phone calls. But the GSM operators alone are not able to supply data for representing all the tourists. VoIP applications have a significant share in the market and there is an increasing trend in the usage of VoIP globally. If international calls are going to be used for monitoring tourist movements, data produced by VoIP applications should be taken into account with GSM data.

Another important point is, VoIP by itself is also not able to monitor all tourist movements. Most of the difficulties of collecting GSM data applies to collecting VoIP data.

Since VoIP means “international phone calls for free” for tourists, we can expect more reliable, representative and high-quality VoIP based positioning data to be produced in the near future.

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## Figures

**Figure I.** International Call Volumes and Growth Rates 1993-2013, TeleGeography, [www.telegeography.com](http://www.telegeography.com)

**Figure II.** Increase in International Phone and Skype Traffic 2005-2013, TeleGeography, [www.telegeography.com](http://www.telegeography.com)

**Figure III.** Tourism Income by Type of Expenditure 2002-2013, TUIK, [http://tuik.gov.tr/PreTablo.do?alt\\_id=1072](http://tuik.gov.tr/PreTablo.do?alt_id=1072)

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