

Patentopolis White Paper 1

Industry report: case of online travel booking

Patentopolis releases a series of White Papers demonstrating, thanks to IP business intelligence:

- How to understand industry changes and be better prepared to new competition challenges.
- How to identify and initiate mergers and acquisition at an early stage.
- How to mine company innovation portfolios and to choose the most adequate IP strategy.

Contents of the present White Paper

Objectives of this White Paper	2
Online travel booking: background information	2
Insights of IP business intelligence into online travel booking	2
Generalized benefits for your daily practice.....	10
How to get started in IP business intelligence: a methodology using Orbit®	10
List of companies	12
List of references	13

This paper has been prepared using the patent data and analytics of Orbit® from Questel



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Objectives of this White Paper

This paper aims to provide insights on last years' changes occurring in the industry of online travel booking. More specifically, it demonstrates the following.

- How to identify leaders in this industry
- How to monitor their trends
- How to read their recent changes and translate them into actions, also in terms of financing

Online travel booking: background information

What is the online travel booking in 2012?

- One of the largest segments of internet transactions¹
- Expected to represent nearly one third of the total global travel market value²

Traditional markets e.g. in the USA keep growing in 2012 while strong market potential is found in emerging markets like China, Brazil and India.

- In the USA: increase by more than 10% is forecasted³ with a market size in the order of US\$ 100 billion
- In Europe: the UK is expected to remain the largest share, followed by Germany and France⁴
- In China: the total online travel market revenue in the first quarter of 2012 reached US\$ 70 billion, 78% of which went to air tickets booking and 13.8% to hotel booking⁵.

Such a growth of the online travel industry is mainly technology-driven, especially in emerging markets like China⁶:

- Increasing internet usage (for instance, China has the world's largest internet user base, representing 23% of the global online population)
- Growth in mobile internet subscribers (in China Mobile internet users have been growing at a CAGR of 45%)

The players operating in this industry face challenges which may jeopardize their development and growth prospects. As a result, the position of existing market leaders is threatened.⁷

- Increasing competition
- Lack of automation
- Restricted entry of foreign players in the domestic markets due to local regulations

In this context, who is actually active in this blooming industry? What are the technology trends? How could these players get prepared to face this changing landscape? Which financial institutions are involved in this industry and what are the financial networks?

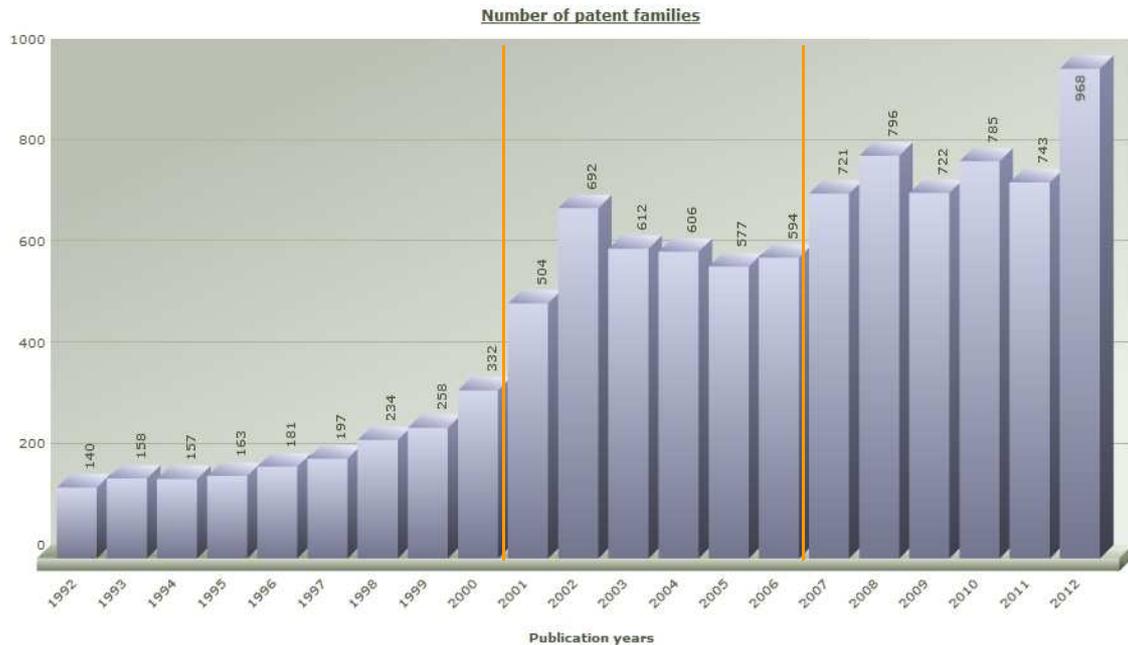
Insights of IP business intelligence into online travel booking

Technology powers the travel industry. Computerized reservation systems have enabled travel professionals to globally book airline tickets, rental cars, hotel rooms, and vacation packages. Figure 1 below shows the innovation pace (here defined in terms of total number of patent families¹ published per year) based on a patent search carried out using Orbit[®] by Questel as explained in page 10.

¹ "Patent family" means all the patents and patent applications relating to the same claimed invention, and usually linked by claiming priority from the same initially filed patent application. There is no such



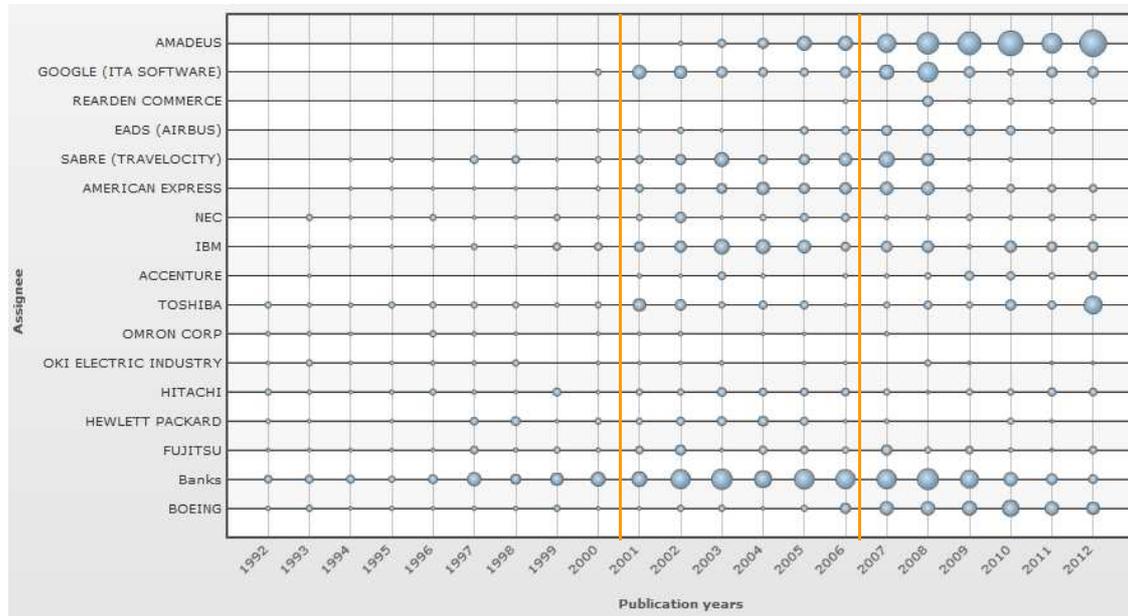
Figure 1: Innovation pace in the online travel industry



Source Orbit® from Questel

Figure 2 below shows the innovation trends for the most active companies and organizations in the field, also based on a patent search carried out using Orbit® by Questel as explained in page 10.

Figure 2: Innovation trends in the online travel industry



Source Orbit® from Questel

As shown in Figure 1 above, the innovation pace in online travel booking shows three phases.

- Phase 1: historical players tend to have established a shared leadership until 2000

thing as a worldwide patent. Regional patents exist only in some parts of the world. In most cases equivalent patents must be filed or registered in all the countries where the patent owner wishes to enforce the patent rights. All these belong to the same patent family.



A few technology companies are specialized in the field, offering platforms to travel agencies, airline companies, and hotel resorts. Such platforms have formed the world's largest travel marketplace, connecting travel buyers and sellers through global distribution system.

- **Sabre** offered its first passenger reservations systems in 1960. Since then, Sabre made continuous technological advances for electronic commerce for the travel and transportation industry. The company operates through four segments: (1) Sabre Travel Network is used by more than 350,000 travel professionals; (2) Travelocity.com allows individuals to make their own travel arrangements; (3) Sabre Airline Solutions provides software, e-business tools, and consulting services to improve the operations of some 400 air carriers and airports; and (4) Sabre Hospitality Solutions does the same for hotels.^{8 9}
- **Amadeus** is another major player in the industry, providing travel reservation and ticketing systems. More than 100,000 travel agencies and 35,000 airline sales offices use Amadeus' global distribution system (the world's largest), which books flights on about 460 airlines. It also makes reservations at some 85,000 hotel properties and about 25 car rental agencies, as well as rail, cruise, tour, and ferry operators. WAM Acquisition owns Amadeus, which is made up of airlines Air France, Iberia, and Lufthansa, equity firms Cinven and BC Partners, and Amadeus management. Amadeus IT Group is a subsidiary of Spain's Amadeus IT Holding, which went public in 2010.¹⁰

Some players in the aerospace industry have also been active in this field

- The airline manufacturer **Boeing** is also actively patenting in the area of online travel booking in relation to modeling processes applicable to airlines and other industries: for simulating and valuing the effects of various products and services; and for cost assessment of service disruptions. Other aspects patented by Boeing include: management of itineraries; rate and capacity planning; resource management view for airline operations; airline traffic modeling and allocation; Virtual Queuing; real time generation of charter flights; and aircraft dispatch information.
- **Thales** (not shown above) is also active. Examples of patents recently published relate to: prediction of air traffic events, especially in the area of assistance in decision making for airlines and airports; scheduling tasks to control the execution of warning procedures on an aircraft; identifying and monitoring the content of an aircraft; and generating electronic documentation for maintenance.
- Phase 2: between 2001 and 2006 newcomers from the internet and IT sectors enter the online travel industry, introducing new practices and driving a new leadership positioning
 - The IT industry prevails, led by IBM and followed with Accenture and others players like Hewlett-Packard and Unisys (not shown above).

IBM has been the IP leader during the last 18 consecutives in the USA, and has also ventured in the field of transaction processing (for the travel industry). Some aspects of their technologies patented in 2010 include: automatic travel content capture tool for address book entries; finding and packing travel articles; location-based services revenue sharing and cost offsetting (wireless online transactions): preserving purchased on-demand transportation entertainment services across separate trips; travel fee rate setting (deterministic, random, based upon travel mode and convenience, based upon vehicle occupancy); intelligently rerouting stranded travelers.



The consulting firm **Accenture** also shows a “long-term” IP strategy to protect its own innovations, often used for promotional purposes. Its main patented technologies relate to: generating travel-related offerings, flight scheduling and optimization, flight tracking, and reservation record-based ticketing.

Unisys is among the global players in the IT consulting business. Its operations are split into two main segments: Services and Technology. Unisys is among the largest government IT contractors, serving local, state, and federal agencies, as well as foreign governments. Other key sectors include communications, financial services, and transportation. Customers have included Air Canada, BT, and the US Department of Agriculture. Unisys’ main patented technologies include: network-based management of airline customer data; Airline management system generating routings; market-level inventory control system; Processing multiple bookings; and demand-tracking system.

- Some main actors of the Internet industry have also moved into travel.

ITA Software is a company founded in 1996 which provides software and IT services to airline and online travel companies. ITA's primary product, QPX, is built into airline and travel websites to enable customer searches for flights, fares, and related information. Its clients include major airlines like United Continental and American, and online travel companies like Hotwire. ITA Software has a long-term IP strategy, with patent production starting in early 2000's.

Rearden Commerce (not shown above) is also a newcomer; it provides an online marketplace for a variety of services. Some 7,500 businesses and millions of consumers use its e-commerce platform to purchase and manage goods and services ranging from travel and entertainment to shipping and event planning. The online platform provides individuals and corporations with control and end-to-end spend management capabilities with a user-centric approach: maximized cost savings, increased adoption, and employee satisfaction. The platform includes the location-aware Mobile Personal Assistant to plug into: any corporate booking tool to incorporate corporate policies and preferred vendors, and any mobile device (iPhone®, Blackberry® and Android® platforms). The Mobile Personal Assistant gives users access to a personalized travel itinerary, real-time travel alerts, dining search and reserving capabilities, flight search, and destination weather information. The company's online and mobile personal assistant and smart apps connect buyers with more than 160,000 suppliers based on personal preferences and company policies. Customers include ConAgra Foods, Kenwood, and The Advisory Board Company. The company was founded in 1999. It has offices in the USA and India. In May 2011 Rearden Commerce announced a 3-year reseller deal with the UK's Advantage Focus Partnership, a division of Advantage Business Travel that includes 77 agencies managing more than \$1 billion worth of business travel.

Rearden Commerce has been very actively patenting recently; examples of 2010-11 patents relate to: automated trip planner; optimization of group shipments to reduce shipping costs; capturing and calculating complex consumer ratings of goods and services; and enhanced portal for services suppliers. Other technologies patented earlier include: preferred vendor pre-transaction bidding; multi-modal travel shopping; presenting travel options; providing travel schedule; changing a personal profile or context during a transaction; view of transactions and events with dynamic updates; tracking spending based on reservations and payments; and automatically rebooking reservations.



- New actor of the travel industry enters also into the scene. For instance, **American Express Travel** innovating on: travel fare determination, price comparison, travel expense benchmark analysis, travel savings assessment, processing travel expenses, interactive demand management (Computer Reservation Systems, Global Distribution Systems), processing ticket refunding, frequent flyer rewards, billing travel transactions, reduce travel-related transaction fraud, and travel service integration.
- Phase 3: historical players and newcomers seek to redefine a new order since 2007:
 - Former newcomers (see Phase 2) tend to make key deals in the online travel space.

Google is a newcomer, with initially very few patents. Instead of developing and protecting in-house proprietary technologies, Google adopted a buy-in strategy with the recent acquisition of **ITA Software** in a US\$ 700m deal in July 2010. Google will employ the company's technology to enhance its online flight information capabilities as it continues to diversify its range of digital services.

Conversely, **Yahoo** is a newcomer with a different IP strategy: developing and protecting in-house proprietary technologies. It has become active with patenting, especially during the last two years. Main patented technologies include: one-stop travel search; real-time parking search; context-sensitive route generation; personal travel organizer; and automatic flight management in an online marketplace.

IBM acquired **BigFix**, a US company focusing on: reducing cost and complexity of managing networked servers, asset inventory/discovery, and software license management (US\$ 400m deal in February 2011). **BigFix** has also been patenting during the last 10 years. Its main patented technologies include: formalizing, diffusing and enforcing policy advisories and monitoring policy compliance in the management of networks; and remotely inspecting properties of communicating devices.

- Newcomers keep entering the online travel field, especially from the mobile sector. A deeper analysis (not shown above) reveals e.g.: **Apple** on accessing travel/hotel services using a portable device; and **Samsung** on providing public transport information, layout modeling system for a transport system, and automatic boarding process.
- Other consumer electronics manufacturers have patenting activity in the field: **Sony** on rental system for vehicle; **Hitachi** on vacant seat reservation, schedule management e.g. for travel expense account, service supply, and transaction processing; and **Toshiba** on optimum route planning for service vehicles, providing service in train, reservation service for reserved seat ticket, and runway reservation.
- The historical players of the online travel field play an increasingly leading role. **Amadeus** has shown the highest growth over the period 2006-2012 while **Sabre** owns the largest portfolio over the period 2001-2011. Sabre keeps expanding e.g. the Middle East markets e.g. Jordan last January.

Special attention is given to the year 2012, with a significant growth compared to the previous years. Is this the start of a new phase?

Insights in the R&D directions taken in the online travel booking can be gained by using various text mining techniques, also based on a patent search carried using Orbit[®] by Questel as explained in page 10. In the following, three different techniques applied to the online industry are shown; note that these three techniques are only given for the sake of illustration and that Orbit[®] offers other text-mining techniques. Figure 3 below shows word cloud, revealing emphasis on low sale price determination, airline ticketing...



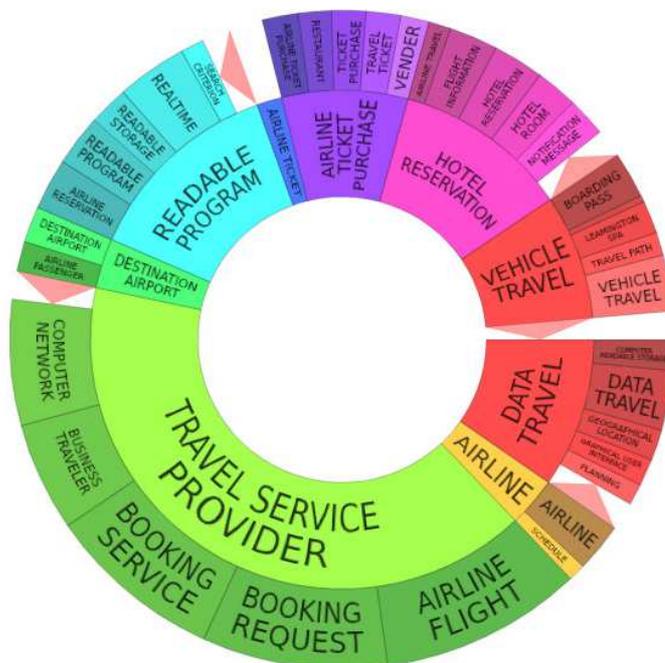
Figure 3: first text-mining (word cloud)

Airline(53) | Airline flight(55) | Airline passenger(35) | Airline reservation(38) | **Airline ticket**(156) | Airline ticket purchase(32) | Airline travel(32) | **Boarding pass**(54) | Booking request(34) | Booking service(36) | Business traveler(37) | **Buying public**(206) | Computer network(35) | Computer readable storage(57) | Computerized reservation(48) | **Consuming public**(198) | Countless objective fulfillment(59) | Data travel(48) | Departure airport(37) | Departure date(50) | Departure location(43) | Destination airport(48) | Electronic ticket(30) | Email address(32) | Executable instruction(32) | Flight information(38) | Flight schedule(53) | Frequent flier(69) | Gas turbine engine(36) | Geographical location(75) | Global distribution(58) | Graphical user interface(40) | Hotel reservation(67) | Hotel room(50) | Identification information(32) | **Labor**(51) | Leamington spa(41) | Low price(82) | **Low sale price**(211) | Notification message(36) | **Novelty feature**(173) | Planning(45) | Readable program(57) | Readable storage(37) | **Realtime**(117) | Receiving travel(35) | **Rental car**(105) | Reservation(58) | Reservation confirmation(33) | Reservation database(32) | Reservation information(50) | **Reservation request**(58) | Restaurant(35) | **Schedule**(51) | Search criterion(39) | Search request(41) | Server computer(36) | Service provider(31) | Ticket purchase(33) | Travel agency(49) | Travel agent(50) | Travel booking(38) | Travel database(34) | Travel information(51) | Travel itinerary(64) | Travel

Source Orbit® from Questel

Figure 4 below shows clusters of innovation areas. Here, the main innovation areas correspond to different market segments (travel service provider, airline reservation, hotel management, restaurant, rental car...) and corresponding technologies (programs, data...).

Figure 4: second text-mining (circular tree-map)



Source Orbit® from Questel

Figure 5 below gives another representation of innovation clusters in a landscape format. It shows that the core technology is commonly used for airline booking and hotel management, while peripheral technologies are used for rental car and airport management.



Figure 5: third text-mining (landscape)



Source Orbit® from Questel

As shown above in Figures 3 to 5, the following main findings have been found.

- Technology developments in the online travel booking are typically in the areas of revenue management, pricing, flight scheduling, cargo, flight operations and crew scheduling.
- A deeper analysis of the three white spaces (i.e. selecting patents in the white spaces shown in dotted line above) reveal concepts in adjacent fields and new applications of information management systems with mass transaction processing
 - Healthcare: for hospitals for processing medical data e.g. on: secure server network to exchange medical data between patients and healthcare professionals; processing of data among caregivers; and processing and delivery of prescriptions; and for insurance companies. Examples of active companies include: **Computer Science Corporation** (CSC) providing systems integration, data center management, and business process outsourcing e.g. billing and payment processing; and the insurance company **Genworth Financial** (specialized in long-term care insurance and health insurance) and **Progressive**.
 - Entertainment (music, movies, online TV) industry, especially in the areas of: Digital Right Management (DRM) e.g. **Intertrust Technologies** which develops and licenses software, technologies and IP for DRM and trusted

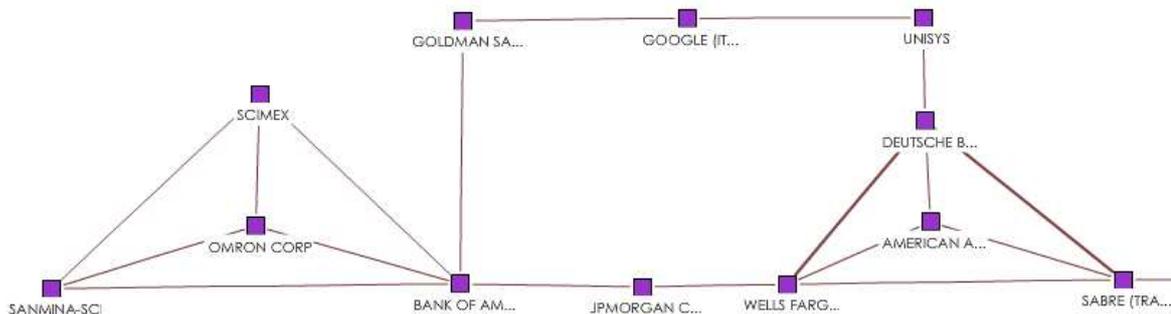


computing; and e-ticketing e.g. **Live Nation Entertainment**, one of the world's largest ticket sellers and promoter of live entertainment, with its expansion into ticketing services with the purchase of **Ticketmaster** in 2010.

- Resource management and logistic e.g. for postal services e.g.: **United Postal Services (UPS)** on determining productivity associated with retrieving items in a warehouse, improving fleet management operations using telematics, and airline maintenance process modeling; and **Deutsche Post /DHL** on planning the travel route of a transport vehicle, and providing Internet services in online marketplaces.
- Other possible applications for mass information systems with multi-users include:
 - Energy management e.g. for smartgrids
 - Defense and security e.g. camera surveillance processing, fingerprints in public arenas, border security
 - Road traffic monitoring, e.g. for safety purposes, on highway. Also for subways

Technologies involved in online travel booking require high level of investment. Financial institutions (banks, trusts, funds, venture capitalists...) also enter the scene; they can be identified through co-ownership of patents developed by companies which they finance. Figure 6 below shows the intricate network of some financial institutions.

Figure 6: co-ownership network – excerpt



Source Orbit® from Questel

Figure 6 reveals a cluster of financial institutions, especially in relation to Google and Sabre.

- **Bank of America** in relation to **Omron** and **Sanmina**
- **Goldman Sachs** in relation to **Google** (including ITA Software – see above)
- **Wells Fargo Bank** and **Deutsche Bank**, in relation to **Sabre** and **American Airlines**

It also reveals collaboration networks in the industry and extra applications beyond core activity.

- **Sabre - American Airlines**
- **Google – Unisys** (providing IT services, software...)
- **Omron** (manufacturing and selling automation components, equipment and systems, but it is generally known for medical equipment such as digital thermometers, blood pressure monitors and nebulizers.) – **Samnina** (global Electronics Manufacturing Services -EMS)



Generalized benefits for your daily practice

IP business intelligence provides insights for innovation management and market positioning. Some may critically consider that such insights have intrinsic pitfalls.

- Incomplete data since not all innovations are patented
- Not current information due to the 18-month delay between filing and publication;
- Difficult to interpret since not all patent filings are made for the same reasons (strategic, opportunistic, shotgun approach...); and that not all patents have the same strength or value

Despite the above, patent information remains a powerful, straightforward approach.

- Objective (reviewed by patent examiners)
- Alive (published every week, all over the world)
- Cost-effective (e.g. compared to market reports)

When cautiously handled e.g. by crossing with other sources (scientific literature, company information...), IP business intelligence can bring, as shown in this paper, direct valuable insights which can help you understand:

- Change in your industry, initiated by technology push (internet, e-commerce)
- Change of leadership coming from new players of other industries
- How to adapt your company's strategy, and the role of IP therein, to face new challenges

Orbit[®] enables users with unique and distinctive functionalities.

- Elaborating complex searches with a great diversity of unique operators
- Quickly finding terms used in the field, even for non-experts, with similar patent searches
- Analyzing and archiving large datasets with a comprehensive suite of analytics
- Setting up alerts to remain aware of the latest trends
- Organizing search results and data thanks to clustering and thesaurus, which users can build for one or subsequent searches
- Sharing results and improve reporting internally

How to get started in IP business intelligence: a methodology using Orbit[®]

The patent search methodology behind the present paper is based on the following concepts.

1. Travelling within the broad meaning of the term, including tourism. However, the following terms have not been included: airport (due to other innovation areas related to, but not relevant for the purpose of this paper e.g. security and safety, border surveillance...).
2. Online reservation. The following terms have not been included: request, query, navigation, and destination (due to other innovation areas related to, but not relevant for the purpose of this paper e.g. GPS, other Internet transactions...)

The above concepts have been translated into patent search strategies. Another advantage of using Orbit[®] is the similarity search which enable users to enlarge their search analysis results.



Concept 1 "Traveling"	Tourism or travel or flight or airline or (destination city) or (rental car) or hotel or restaurant
Concept 2 "online booking"	reservation or booking or (itinerary combination) or (journey slice) or planning or schedule or (availability check) or rechecking or ((choos+ or retriev+ or tracking or low or lowest or database or process) 5d (fare+ or faring or price+ or pricing)) or ((seat or flight or table or room) 5d availability) or ticket+

Furthermore a series of technology codes (IPC, ECLA) have been found relevant.

Codes	Meaning
G06Q10/025	DATA PROCESSING FOR Administration; Management : Reservations, e.g. for tickets, services or events: Coordination of plural reservations, e.g. plural trip segments, transportation combined with accommodation
G06Q10/047	DATA PROCESSING FOR Administration; Management: Optimisation of routes, e.g. "travelling salesman problem"
G06Q30/0206	DATA PROCESSING FOR : Commerce, e.g. shopping or e-commerce : Marketing : Price or cost determination based on market factors
G06Q30/0283	DATA PROCESSING FOR Commerce, e.g. shopping or e-commerce : Price estimation or determination
G06Q30/04	DATA PROCESSING FOR Commerce, e.g. shopping or e-commerce : Billing or invoicing, [N: e.g. tax processing in connection with a sale]
G06Q20/00	DATA PROCESSING FOR Payment architectures, schemes or protocols
G06Q50/14	DATA PROCESSING FOR a specific business sector : Travel agencies
G06Q50/12	DATA PROCESSING FOR a specific business sector : Hotels or restaurants

Finally, the company names have been filtered and reformatted in order to bring forward the relevant activities. Using Orbit® data rules, a series of companies, their name variations and affiliates has been used to optimize the final dataset; some have been grouped and renamed (shown in bold below) and others have been deleted (shown in red below).

Figure 7: company thesaurus building using "data rules administration" in Orbit® - excerpt

SABRE (TRAVELOCITY) (3 ITEMS)	56
<input type="checkbox"/> SABRE	40
<input type="checkbox"/> TRAVELOCITY COM	23
<input type="checkbox"/> SABRE HOLDINGS	8
<input type="checkbox"/> AMERICAN EXPRESS	55
OMRON CORP (3 ITEMS)	41
<input type="checkbox"/> OMRON TATEISI ELECTRONICS	32
<input type="checkbox"/> SCIENTIFIC TECHNOLOGY	9
<input type="checkbox"/> OMRON	1
<input type="checkbox"/> MITSUBISHI ELECTRIC	41
<input type="checkbox"/> GENERAL ELECTRIC	40

Source Orbit® from Questel



List of companies

The following companies have been listed in this White Paper.

Accenture, 5	ITA Software, 5, 6
Amadeus, 4, 6, 13	Live Nation Entertainment, 9
American Airlines, 9	Omron, 9
American Express Travel, 6	Progressive, 8
Apple, 6	Rearden Commerce, 5
Bank of America, 9	Sabre, 4, 6, 9
BigFix, 6	Samsung, 6
Computer Science Corporation, 8	Sanmina, 9
Deutsche Bank, 9	Sony, 6
Deutsche Post /DHL, 9	Thales, 4
Genworth Financial, 8	Ticketmaster, 9
Goldman Sachs, 9	Toshiba, 6
Google, 6, 9	Unisys, 5
Hitachi, 6	United Postal Services (UPS), 9
IBM, 4	Wells Fargo Bank, 9
Intertrust Technologies, 8	Yahoo, 6



List of references

¹ Market research report "Global E-Commerce Industry" published by ReportLinker on January 2012, p.10. Accessible via <http://www.reportlinker.com/p0788390-summary/Global-E-Commerce-Industry.html>

² Market research report "Global Online Travel Report 2012" published by ReportLinker on March 2012. Accessible via <http://www.reportlinker.com/p0799335/Global-Online-Travel-Report.html>

³ See endnote 2

⁴ See endnote 2

⁵ China Internet Watch "China Online Travel Market Update for Q1 2012", 2 May 2012. Last retrieved at <http://www.chinainternetwatch.com/1446/china-online-travel-q1-2012/> on 20 November 2012

See also "China Tourism Industry Forecast to 2012" published by Report Buyer in July 2011. Accessible via www.reportbuyer.com/leisure_media/tourism_travel/china_tourism_industry_forecast_2012.html

⁶ Market research report "Online Travel Market in China 2012" published by Research and Markets on March 2012. Accessible via www.researchandmarkets.com/reports/2099080/online_travel_market_in_china_2012

⁷ See endnote 2

⁸ "Sabre History", last retrieved at http://www.sabre.com/home/about/sabre_history on 20 November 2012.

⁹ Company information about Sabre Holdings Corporation, published by Hoovers. Last retrieved at www.hoovers.com on 20 November 2012.

¹⁰ Company information about Amadeus IT Group SA, published by Hoovers. Last retrieved at www.hoovers.com on 20 November 2012.