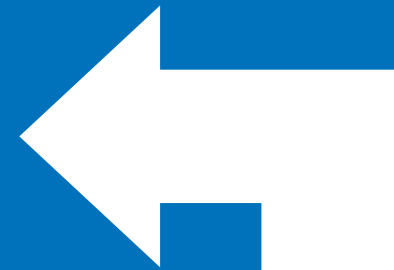


€568 million
2014 R&D investment



R&D investment
represents

16.6%
of total revenue



4

Research, development and innovation

The 2014 EU Industrial R&D Investment
Scoreboard ranks Amadeus as

**Top R&D
investor**

in the Travel &
Tourism sector



Research, development and innovation

Research & Development (R&D) is a key strategic priority for Amadeus. We consider innovation as one of our key assets that provides us with market leadership. Amadeus R&D is the part of the organisation that has the responsibility of building innovative solutions for our customers. These solutions are based on a wide range of core products and components that are integrated for the specific needs of customers.

Amadeus R&D puts a special emphasis on the reliability and quality of its systems, products and services. This is a permanent objective as R&D teams conceive, design, develop and maintain some of the world's most complex, widely available, real-time information systems accessed daily by hundreds of thousands of travel professionals and end users in almost all areas of the travel industry.

A global approach

This investment is supported by a network of 18 R&D centres across the world. Nice (France) is the largest site for R&D activities, with on-site and worldwide teams developing solutions for travel distribution, e-commerce, travel agency points-of-sale, airlines, hotels, railway companies, airport IT and travel intelligence.

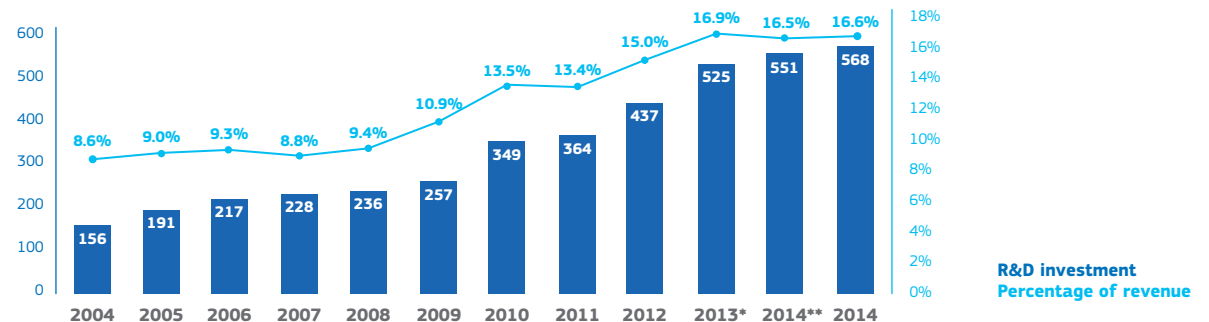
This R&D global network organisation is deployed regionally along a model of hubs with a global mission and transversal activities, with satellites either dedicated to specific applications or domain expertise – or for some, dedicated to supporting customer projects. All sites work closely with others, and teams working on a project can be distributed among sites. In 2014, the R&D team completed the deployment of common methodology and tools for software programming, quality assurance and more generally for all phases of the product development cycle

across all development centres. This is a tangible result of the improvement programme launched in January 2013, with the creation of a transversal division to support, via competence-driven governance rules and communities, cross-fertilisation between sites in the domains of architecture, software engineering, project management, tools, and shared best practices.

Our global networked organisation includes the central R&D centres of Bangalore (India), Boston (US) and Nice (France), complemented by the R&D sites of Aachen (Germany), Antwerp (Belgium), Frankfurt (Germany), Istanbul (Turkey), London (United Kingdom), Madrid (Spain), Miami (US), Strasbourg (France), Sydney (Australia), Toronto (Canada), Tucson (US) and Portsmouth (US), as well as regional centres in Bangkok (Thailand), Bogota (Colombia) and Warsaw (Poland).

Amadeus R&D investment

(Including capitalised R&D, figures in € million)



* Following a review of the costs incurred in a number of projects, certain costs, which were previously not reported as R&D were identified as such and are reported under the R&D investment figure above since January 2014. For comparability purposes, the 2013 figures have been adjusted to include such costs (which amounted to €11.1 million in the year 2013).

** Excluding the 2014 acquisitions (Newmarket, UFIS and i:FAO) for comparability purposes.

Recruitment is oriented towards incorporating a wide range of expertise and international culture in order to develop global products. Staff mobility, short or long term, is encouraged. Amadeus also offers numerous internships to top international schools, with a formal recognition of their contribution (we organise a yearly contest among interns).

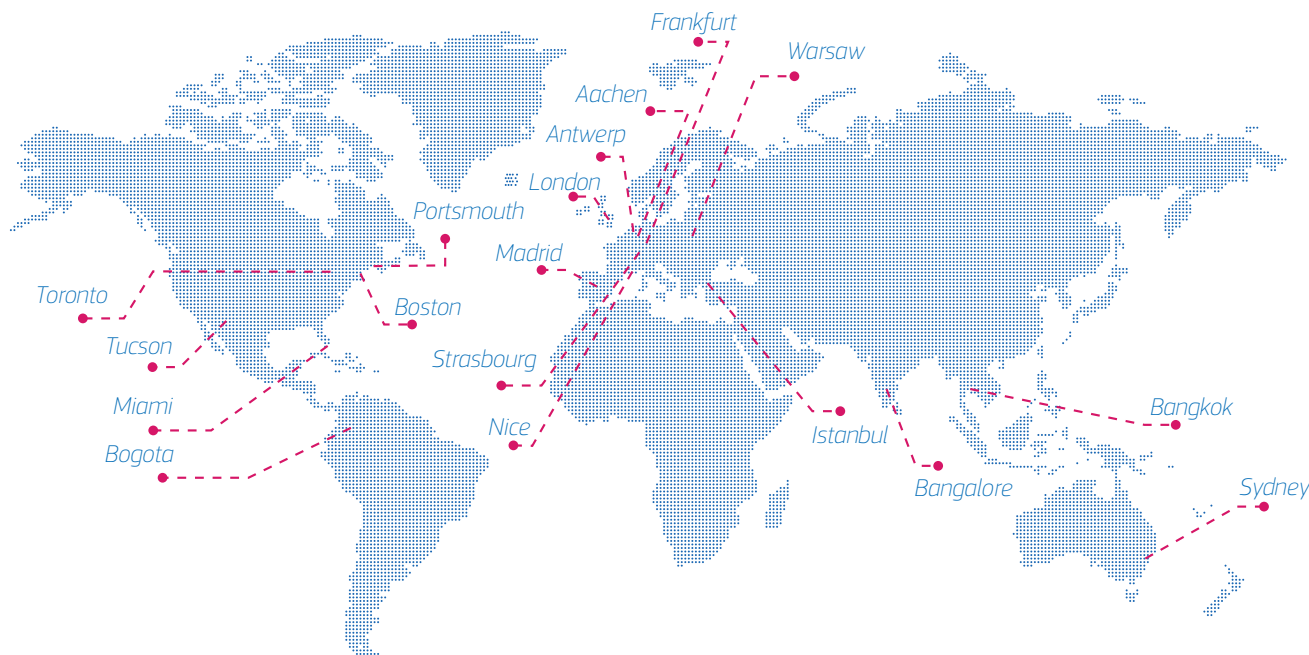
Amadeus pays particular attention to providing staff with stimulating environments that enhance creativity and help spark innovative ideas. In 2014, Amadeus pursued

See 'Amadeus people' p. 105

the redesign of office space to reflect our core values and promote staff interaction, as well as incorporated a new site in the Nice area along these guidelines.

We also promote a culture of innovation across all R&D teams. The innovative framework is now in place with the objective of boosting the emergence of ideas and the analysis of potential applications, with a focus on prototyping the internal R&D research lab via contests (hackathons, participation in major tradeshows, competitions, etc).

Amadeus global R&D network



Amadeus ranked as the leading R&D investor in the travel and tourism industry*

Since 2004 we have invested more than €3.5 billion in R&D

* The 2014 EU Industrial R&D Investment Scoreboard contains economic and financial data for the world's top 2,500 companies ranked by their investments in research and development. For further information, visit <http://iri.jrc.ec.europa.eu/scoreboard14.html>

Innovating the future of travel

Amadeus is constantly leveraging major technology trends in the IT industry to innovate in the field of travel. Our purpose of shaping the future of travel translates practically into mastering and applying emerging techniques to foster new practices in how people travel and how the tourism industry can serve them more efficiently.

We pursue our endeavours in five strategic areas:



_Cloud-based architecture: this area includes the design, architecture and operation of applications capable of running in standardised low-cost, low-consumption hardware, potentially distributed across multiple data centres. This is a general trend in the industry, led by the biggest IT companies. In 2014, Amadeus made substantial inroads in this direction, in particular with advanced techniques covering reliable and fast data replication across systems in different locations. Our investment in cloud-based techniques aims at supporting the highest system

availability by redundancy and isolation of platforms, what we refer to as 'Ultra-High Availability'. It is also the backbone of our planned evolutions towards massive data and wider geographical footprints for operations.



_Security: this is at the heart of Amadeus systems, both for the design of applications and for operations. Security of data is ensured by advanced techniques, including sophisticated methods of encryption for critical data. Amadeus systems are compliant with PCI DSS* security standards (certification renewed in 2013). In 2014, Amadeus pursued (and will continue to pursue in future years) its commitment to world-class security by exploring and implementing advanced security methods, in particular in the field of user and device authentication, fraud prevention and detection, system-to-system access, and encryption of data in distributed environments. This effort covers our own systems but also extends to services offered to our customers and partners about security.



_Massive data: the technical capability of handling extremely large volumes of data has been highlighted by travel providers as a key factor in drastically improving their service to customers, but


also in optimising their operations. Advanced search is a domain of application of these techniques. Providers (airlines, hotels, etc.) are clearly moving to a contextual search whereby the price and availability of their product is based on the exploitation of data such as trip history, customer ranking and full view of the trip, as well as the identification of the requester and traveller, in order to dynamically create the best-suited answer. This makes it possible to provide enhanced contextual services and customised offers. In 2014, Amadeus produced first implementations of massive data platforms, leveraging techniques such as NoSQL databases and grid-based distributed data clusters.



_Real-time analytics: in 2014, Amadeus' R&D pursued the consolidation of a strong team for Travel Intelligence, with both software engineers and data scientists. We also made substantial progress on the industrialisation of frameworks and applications for reporting and analysing data on a large scale. Data mining is a promising source of optimisation for travel providers, because it powers decision systems, dynamically adapting functionality to the environment e.g. analysis of passenger traffic, customer behaviour when changing e-commerce applications, etc. Amadeus puts a particular focus on real-time analytics and

* The Payment Card Industry Data Security Standard (PCI DSS) is a proprietary information security standard for organisations that handle branded credit cards from the major card brands. Mandated by the card brands and run by the Payment Card Industry Security Standards Council, the standard was created to increase controls around cardholder data to reduce credit card fraud via its exposure.

invests in advanced and non-conventional database techniques to innovate in this field. ●

 **_Mobile:** more than ever, travellers enjoy the power of mobile devices for arranging and controlling their travel. Amadeus has always been active in this field, and will continue investing in new forms of user interaction, including voice recognition, wearable technology and other methods becoming popular. With its central architecture, Amadeus can provide the traveller with ubiquitous access to data and transactions, whatever the channel used. In 2014, Amadeus pursued the development of its digital multi-channel platform aimed at making the traveller's life as easy as possible by providing them with the essential services they can expect at every step of the trip. In parallel, Amadeus also invests in mobility for travel professionals, as a means of providing a better service, in particular during the trip. ●

For the particular trends highlighted above, but also more generally in terms of all functional improvements developed in our applications, Amadeus is strongly committed to bringing innovation to its customers and beyond – to the travellers they serve. In this respect, we ensure our technology remains at the forefront of the industry.

● See 'Travel Intelligence' p. 56

● See 'Mobile' p. 61

World-class technology

Our architecture is based on distributed open systems* offering particular advantages in:

- 1_ **Extremely high-performance** transaction processing under stringent system availability, security and dependability requirements.
- 2_ **Management of very large databases** with full transactional integrity, including in distributed configurations.
- 3_ **Extra-fast response time for all functions**, from any point of access in the world.
- 4_ **Multi-channel customer servicing applications:** agent desktops, websites, kiosks, mobiles, tablets, and increasingly more programming access (Web Services API**), for fast integration in external systems and web sites.
- 5_ **Hundreds of thousands of concurrent professional users** (and even more end-consumers), with system access via a wide range of devices and methods.
- 6_ **Large base of customers** from small to large scale, with very diversified requirements and practices, all served from a single set of community applications.
- 7_ **Wide range of applications** and functional fields covered, for both Distribution and IT Solutions.
- 8_ **Capable of maintaining and evolving** all applications and system software during system running and ongoing servicing of customers.

* Open systems in computing and informatics refer to a class of systems built using open source software (OSS) standards and that offer a good level of portability and independence from the hardware platforms on which they operate, especially in contrast to the more entrenched mainframes that were common in the travel industry.
 ** API refers to 'Application Programming Interface'. It is language that enables communication between computer programs.

Open systems - Amadeus technology and operational excellence (2014 figures)

Bookings **526 million**
 Passengers boarded **695 million**
 Transactions per second **30,000 + (peak)**
 Average response time **< 0.5 sec**
 Storage **30+ petabytes**

This modern architecture is continuing its global migration to open source software as it becomes more and more powerful. This is allowing Amadeus to move away from proprietary software and hardware, and benefit from the latest technological evolutions brought by the IT industry.

The Amadeus patent programme has seen an acceleration in 2014 versus 2013, both for granting and filing. This follows the initiative started in 2011 for collecting and reviewing innovative propositions and coaching inventors in their drafting process.

Thanks to our continued R&D investments, our expertise and leading solutions are widely acknowledged and respected by the travel and tourism sector's leading players.

True partnership with the travel industry

When Amadeus was founded in 1987, the decision was made to base our architecture and software development model on a partnership approach with two major objectives:

1 Airlines and travel agencies sharing the same core reservation functionality. The system user concept promotes substantial synergies in the development of applications, and it allows the airline and the travel agency's respective direct channels to share common processes, practices and data, avoiding complex synchronisation of systems. This is extremely important for the convenience of the travellers, who are served by both and can benefit from a single view of their trip.

2 Amadeus serving a wide range of customers in the travel sector from a common core architecture with the required adaptation and customisation for each customer. This approach is essential in evolving the Amadeus system to the global requirements of the industry, rather than individual customers. As a result, Amadeus' applications are always in a better position to anticipate the major evolutions in travel, and combine their own power of innovation with the concrete real needs of all travel players. In other words, Amadeus works for the travel industry, via joint collaboration with our customers and partners.

These decisions were instrumental in giving Amadeus an advantage over our competitors, and today they continue to do the same.

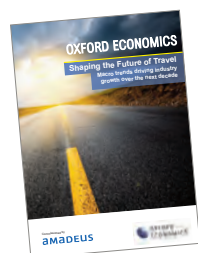
R&D more than ever continues to keep Amadeus' platform architecture compliant with these two objectives, which have the final goal of providing 'solutions' to our customers, comprising a combination of core components and services for integration.

Thanks to its synergetic architecture between Distribution and IT Solutions, Amadeus' technology can serve all distribution channels. In 2014, this approach has proven successful in the area of ancillary services, which are evolutions impacting both airlines and travel agencies, as well as in the upcoming travel intelligence platform.

Amadeus has a proven track record of working in partnership with our customers on large projects. We maintain formal dynamic customer communities with regular conferences, as well as bilateral meetings to confer about product roadmaps, innovation and industry trends.

White papers

In 2014, we continued to focus on maintaining our position as a leader in research and innovation by facilitating some of the travel industry's best reports.



Shaping the Future of Travel: Macro trends driving industry growth over the next decade

This report explores macroeconomic forecasts, the impact of emerging markets, and whether the vision of a more connected travel industry is within reach, with the primary objective of encouraging thinking about the future so that we are all better placed to shape the future of travel in the years that lie ahead.



Cleared for take-off: Strategies in Lean IT, and how they're relevant to the travel business

This paper urges travel businesses to adopt and apply the principles of 'lean' thinking across IT and operations, or risk being left behind. The Amadeus commissioned research was written by innovation forecaster James Woudhuysen and argues that only by embracing lean thinking in IT, and removing those activities that do not create value for the customer, can the industry also have more control over both system complexity and costs.



IT makes sense to share: Making the case for the cloud in Common Use airport technology

Collecting the viewpoints of over 20 senior IT leaders from the airport industry – this insight paper investigates the business case for adopting cloud-based Common Use systems at airports, with the objective of opening the debate within the airport community on the importance of cloud-based Common Use systems in the future.



Thinking like a retailer: Airline merchandising
Coinciding with the annual Amadeus Digital conference, Amadeus launched this study, which provides a better understanding of the impact of different merchandising techniques. It also outlines the key elements that must underpin a successful merchandising strategy: better knowledge of the customer journey, how to combine different techniques for maximum impact, the importance of tailoring to the channel, and taking into consideration the impact of service and price.



Shaping the Future of Travel in the Gulf Cooperation Council: Big Travel Effects

The report, which uses information gathered from a survey of 1,000 travellers from the region as well as interviews with thought leaders in the travel industry, examines and contextualises the various ways a new travel landscape will develop in the Gulf region over the next fifteen years.



Amadeus Business Travel Insights 2014 - Hotels 360

This report looks into the changing landscape of hotel distribution and its implications for the role of travel management companies in meeting the needs of modern business travellers. Commissioned with the Guild of Travel Management Companies (GTMC), this report identifies the key changes around channel complexity, rate parity in the business hotels sector and issues around systems integration and duty of care.