{ paradigma

CASE STUDY
NH HOTELES

Big Data applied to
Customer Satisfaction intelligence

" ***Paradigma did a fantastic job in turning our knowledge of the business into a useful tool. They are true Internet natives.*** *"*

Javier Carazo, Quality and Competition SVP, NH Hoteles

INDEX

1 Problem

About NH Hotels

With **400 hotels** and **60,000 rooms** in **26 countries**, NH Hoteles ranks among the **top 25** chains in the world and 3rd in the European ranking for business hotels. NH Hoteles is listed on the Madrid Stock Exchange and on the New York Stock Exchange (OTC Market).

Travellers are some of the most empowered consumers

Hotel guests write reviews in multiple sites and social networks on the Internet. **Hotel reviews sites and social networks shape up the industry.**

As NH Hoteles aggressively expanded their network, the reporting of customers' feedback became ever more complex. Online reputation is commonly related to marketing, branding and online reputation management.

NH Hotels looked into collecting and reporting customers' reviews in an efficient way. They carried out some trials on standard software. Some tools focused on listening to online reviews. Others were built to benchmark the competition. It soon became apparent that the off-the-shelf tools were lacking in flexibility. **One-size-fits-all software packages failed to deliver a lot of the features that were crucial for NH Hoteles.**

Javier Carazo of NH Hoteles had a conversation on the phone with Nacho Cabrera of Paradigma in April 2010. Neither of them could foresee at the time that the call kicked off a collaboration that is still alive and thriving nowadays.

2 Solution

A SaaS metrics tool

NH Hoteles had a clear view of what was needed and how. Paradigma listened to the needs of NH Hoteles and built exactly what was needed in record time.

Paradigma implemented agile methodologies. A NH Hotels representative became a member of a small team. This was critical in focusing on the deliverables for a maximum value and efficiency. **Short iterative development cycles allowed meeting deadlines at ease.**

Innovative technology with a pragmatic approach

NH Hotels' involvement in the development team helped Paradigma earn the trust to select the right technologies for the project. Paradigma was free to pick the best or simplest approach for each need. This allowed **Paradigma to shorten the lead times.**

Paradigma had a vast experience in complex crawling and large databases. New natural language processing and semantic web libraries in Python were developed ad-hoc. In only 4 months, the task force involving NH Hotels and Paradigma built the first operational version of the tool. The result was the **"Quality Focus Online"** tool. The new tool could listen to tens of thousands of customer reviews of NH Hoteles their competitors per week and produce basic metrics.
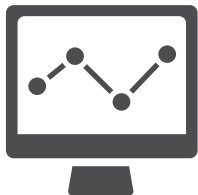
Quality Focus Online

The Quality and Competition team at NH Hoteles presented the tool at the company's International Convention in Berlin in November 2010. **The whole network adopted it immediately.**

The tools display data via a graphs and tables that make them easy to understand and drill in search of details. As a testimony to the user-friendly approach of Paradigma, the use of the tool didn't require any training or even a manual for its take-up to grow exponentially during the first weeks after the launch.

About the Quality Focus online tool

The Quality Focus Online tool processes, interprets, rates, reports and monitors the reputation and performance of the 400 hotels of the network, individually. It turns a lot of unstructured information into meaningful and actionable analysis.

Half of the guests' reviews analysed by the tool are from NH Hoteles' own surveys and half from reviews on 3rd party sites like Tripadvisor.

The attributes of performance include cleanliness, value for money, service, location, room, food and premises. Clippings of individual guests' reviews can be individually processed and analysed. Crucially, each hotel can be compared to its competition locally so benchmarks are easy and ongoing.
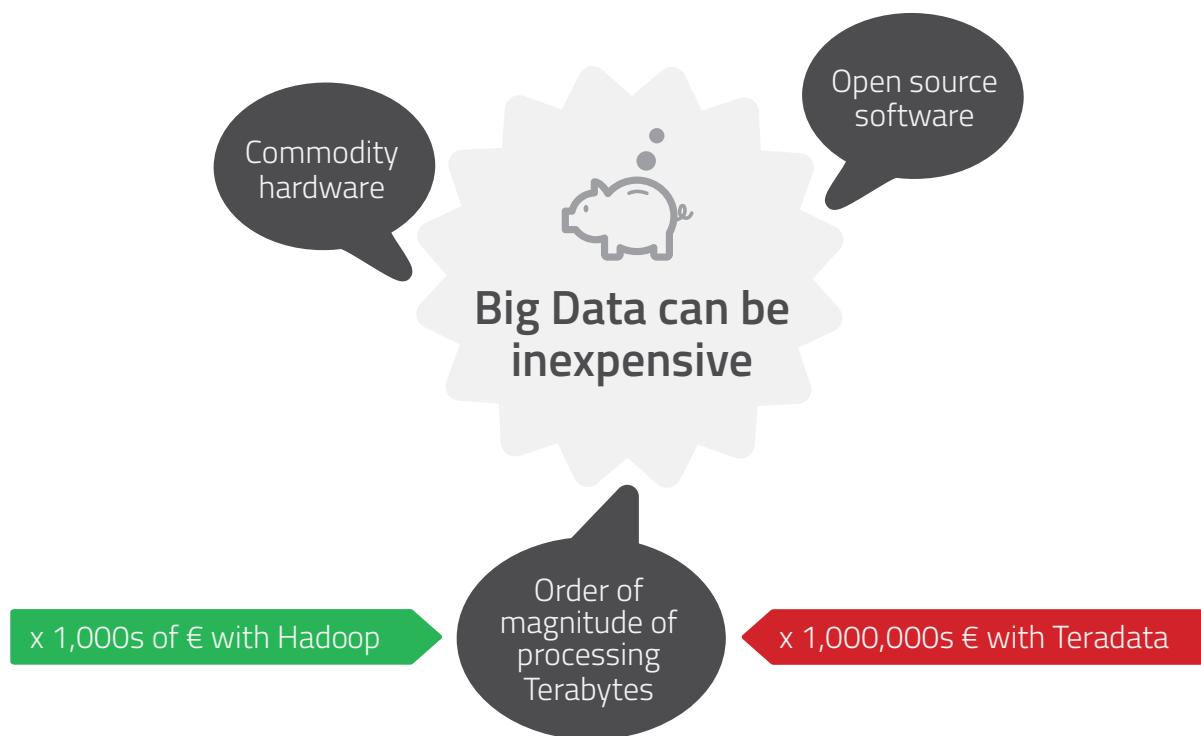
Big Data technologies applied to the travel industry

Big Data for NH Hotels

The value of Big Data consists in answering the best answers to the toughest questions not in how it is implemented.

Paradigma put together modular components of Big Data technologies and adapted them specifically to NH Hoteles. In only four months we had a systems based on batch processing on Hadoop. Since then we improved the Big Data platform iteratively.

The extreme flexibility of this approach saved **NH Hoteles not only time and CAPEX but becoming captive of a vendor lock-in**. NH Hoteles kept the control of the whole process, the data and the software without having to train its analysts or sign up to expensive packages and suites.

Commodity hardware

Open source software

Big Data can be inexpensive

Order of magnitude of processing Terabytes

x 1,000s of € with Hadoop
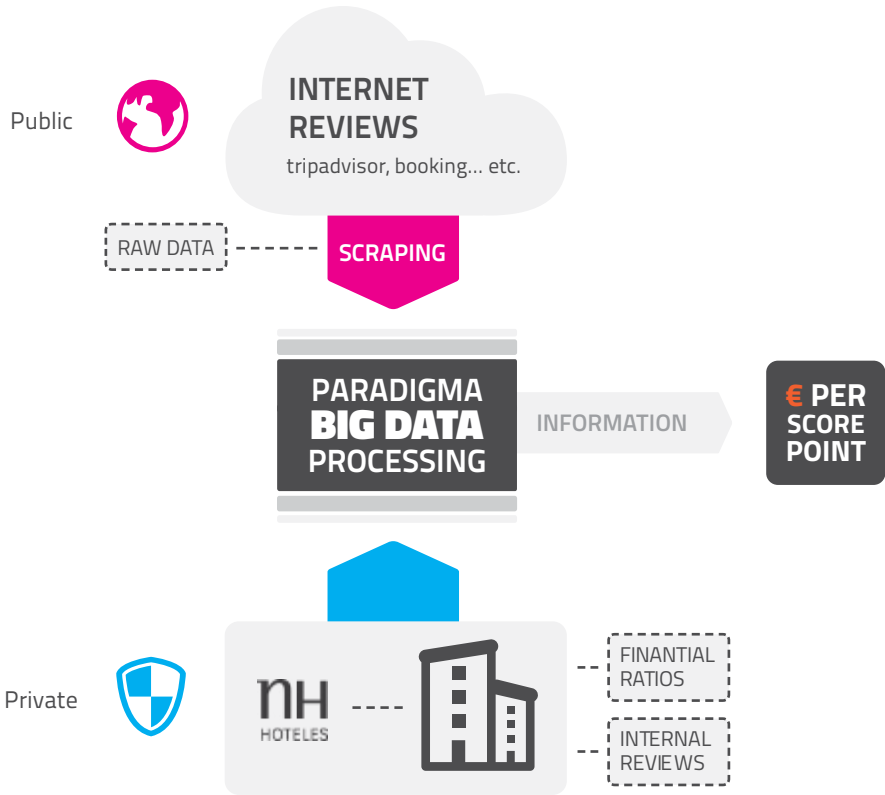
x 1,000,000s € with Teradata

A true Big Data scheme

Big Data reaches its maximum potential when public data are combined with private ones.
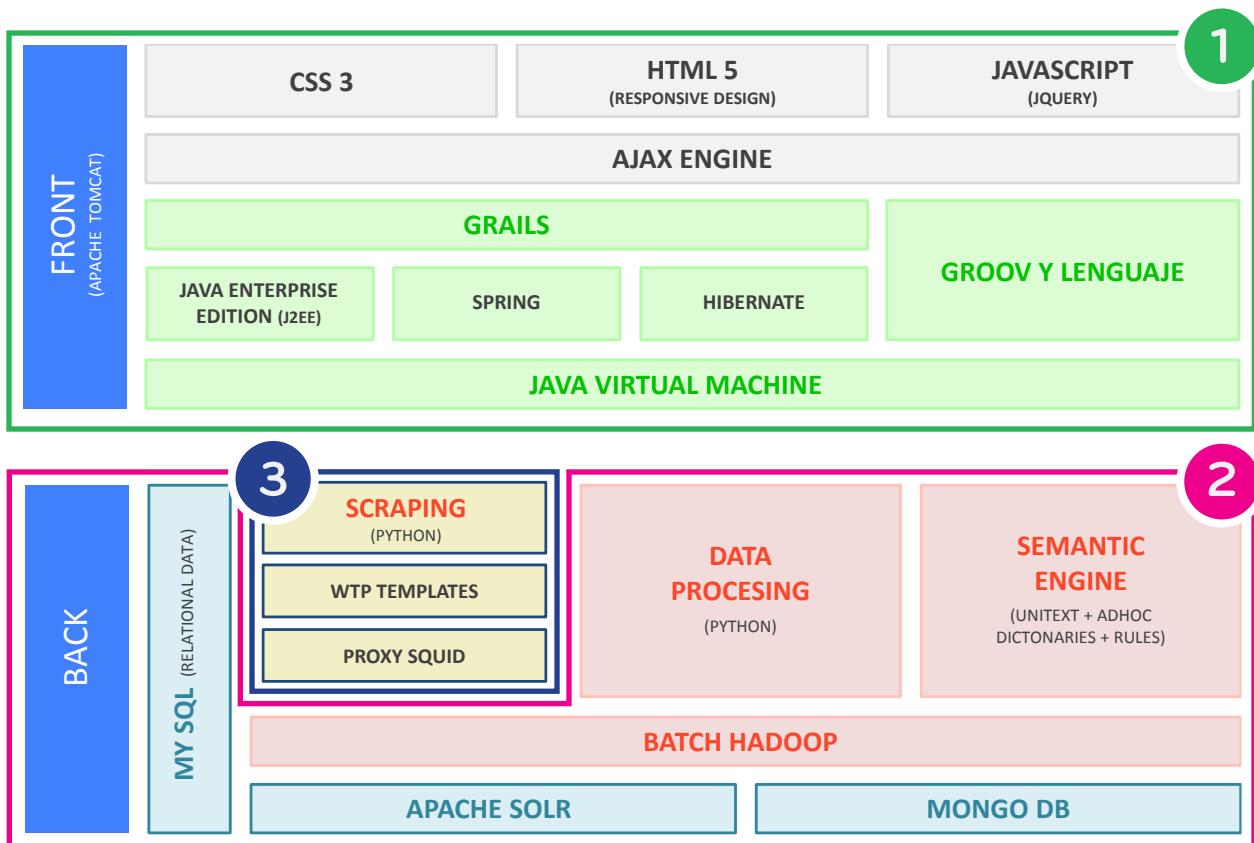
The public data of interest for NH Hoteles are data mined from hotel reviews on social networks and user-generated content sites like Tripadvisor.com. The challenge of public data is their sheer volume, their unstructured and non-relational nature and their rate of refreshment at a rate of tens of thousand of new reviews in several languages per week, from multiple and ever changing websites.

The private data are NH Hoteles' own satisfaction reviews and financial ratios and input. The challenge is to deal with the extreme degree of flexibility in formats ands content that quality analysts demand to match their requirements.

The combination of both private and public data allows for extremely updated and granular information. NH Hoteles asked Paradigma to build a solution from scratch instead of trying to adapt existing legacy Business Intelligence systems.

Big Data platform

FRONT (APACHE TOMCAT)	CSS 3	HTML 5 (RESPONSIVE DESIGN)	JAVASCRIPT (JQUERY)	①
	AJAX ENGINE			
	GRAILS		GROOV Y LENGUAJE	
	JAVA ENTERPRISE EDITION (J2EE)	SPRING	HIBERNATE	
	JAVA VIRTUAL MACHINE			

BACK	MY SQL (RELATIONAL DATA)	③ SCRAPING (PYTHON)	DATA PROCESING (PYTHON)	SEMANTIC ENGINE (UNITEXT + ADHOC DICTONARIES + RULES)	②
		WTP TEMPLATES			
		PROXY SQUID			
		BATCH HADOOP			
		APACHE SOLR		MONGO DB	

① The interactive front

Grails y JQuery allowed a fast development and interactivity with data via AJAX.

② Scraping of public Internet

The scraping included WTP templates and a distributed proxy SQUID.
This configuration allows to carry out anonymous queries and automated tests. This in turn is critical for a fast response times when websites change their code or front.
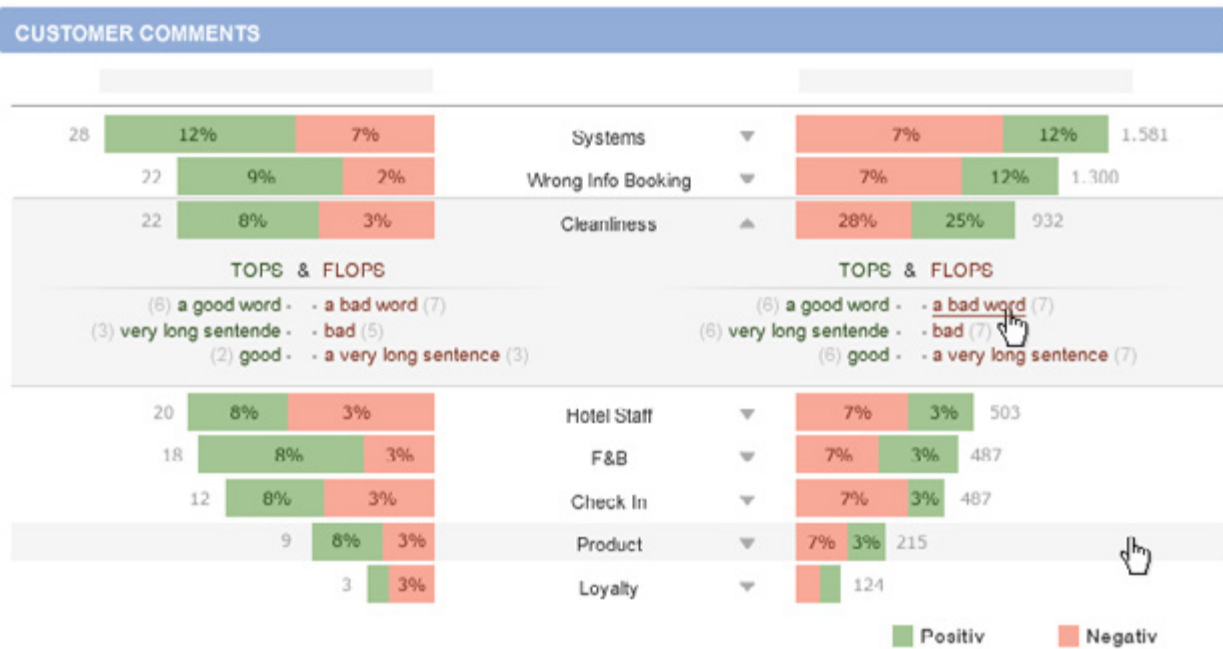
③ Storing and processing data

Python was used for the back, including scrapping and data processing.
Apache Solr was chosen as an engine of persistence. It is scalable and it offers plenty of support for filters and numerical series.
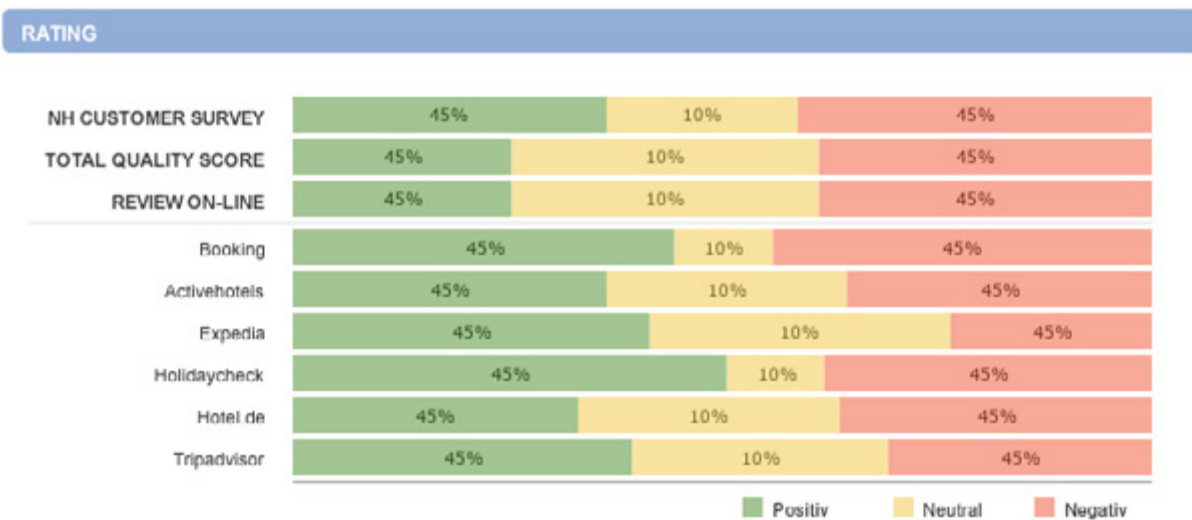
The semantic analysis of free text was carried out with Unitext on MongoDB. This allows to extract key topics out of a large volume of unestructured data of hotel reviews and users' opinions on the Internet

Quality Focus Online functionalities

Example of the Tops § Flops functionality

28	12%	7%		Systems	▼	7%	12%		1.581
22	9%	2%		Wrong Info Booking	▼	7%	12%		1.300
22	8%	3%		Cleanliness	▲	28%	25%		932

TOPS & FLOPS	TOPS & FLOPS
(6) a good word · · a bad word (7) (3) very long sentende · · bad (5) (2) good · · a very long sentence (3)	(6) a good word · · a bad word (7) (6) very long sentende · · bad (7) (6) good · · a very long sentence (7)

20	8%	3%	Hotel Staff	▼	7%	3%	503	
18	8%	3%	F&B	▼	7%	3%	487	
12	8%	3%	Check In	▼	7%	3%	487	
9	8%	3%	Product	▼	7%	3%	215	
3	3%		Loyalty	▼			124	

■ Positiv   ■ Negativ

Example of the ratings

RATING

	Positiv	Neutral	Negativ
NH CUSTOMER SURVEY	45%	10%	45%
TOTAL QUALITY SCORE	45%	10%	45%
REVIEW ON-LINE	45%	10%	45%
Booking	45%	10%	45%
Activehotels	45%	10%	45%
Expedia	45%	10%	45%
Holidaycheck	45%	10%	45%
Hotel de	45%	10%	45%
Tripadvisor	45%	10%	45%

■ Positiv   ■ Neutral   ■ Negativ

NH direct surveys

Paradigma develop a tool to generate surveys with a short cycle of analysis and immediate actionable information: reviews about breakfast, lounges, etc

Each survey is accessed via a QR code. The code is printed on napkins in the lounge or on breakfast trays. It redirects to a responsive front-end with a short form to get input data directly from guests' mobiles and tablets.
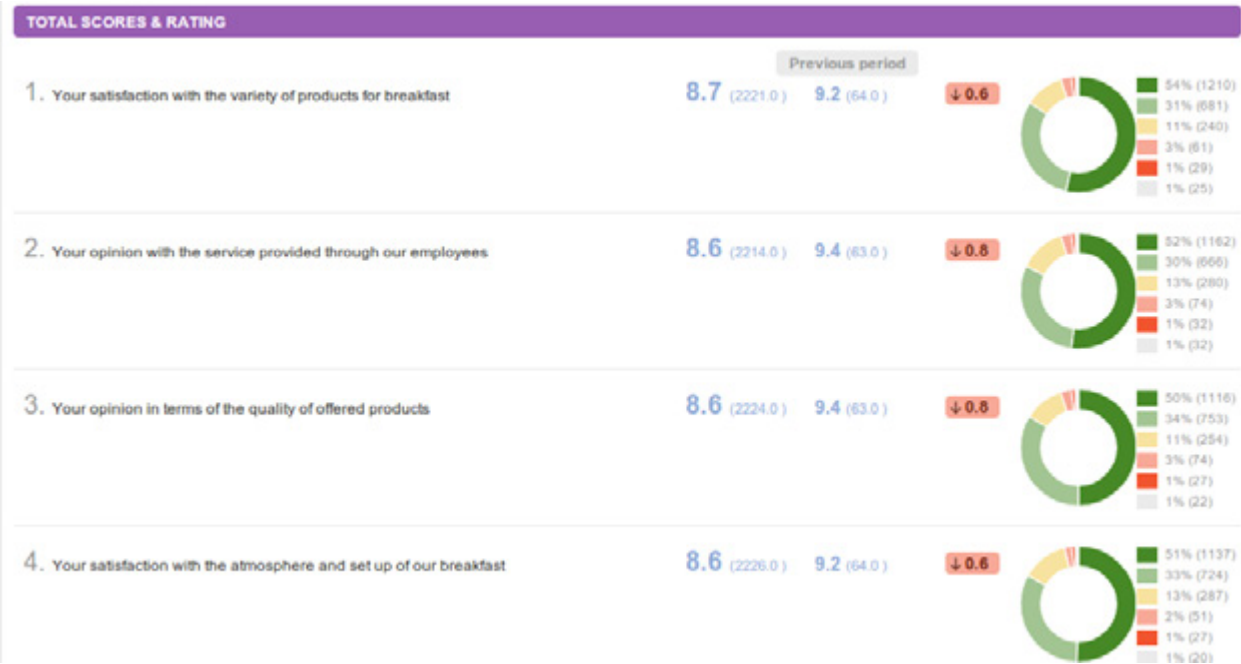
The NH Hoteles front end includes an interface with graphs, filters, etc

This new tools is a huge success to measure the service standards of each hotel in almost real time.

Quick response survey front

Quick response survey back-office

TOTAL SCORES & RATING				
		Previous period		
1. Your satisfaction with the variety of products for breakfast	8.7 (2221.0)	9.2 (64.0)	↓ 0.6	54% (1210) 31% (681) 11% (240) 3% (61) 1% (29) 1% (25)
2. Your opinion with the service provided through our employees	8.6 (2214.0)	9.4 (63.0)	↓ 0.8	52% (1162) 30% (666) 13% (280) 3% (74) 1% (32) 1% (32)
3. Your opinion in terms of the quality of offered products	8.6 (2224.0)	9.4 (63.0)	↓ 0.8	50% (1116) 34% (753) 11% (254) 3% (74) 1% (27) 1% (22)
4. Your satisfaction with the atmosphere and set up of our breakfast	8.6 (2226.0)	9.2 (64.0)	↓ 0.6	51% (1137) 33% (724) 13% (287) 2% (51) 1% (27) 1% (20)

Balance score card

 As NH Hoteles invested in its quality program, Paradigma developed more sophisticated features. For instance, a new integration with financial ratios and accounts now allows NH Hoteles to prioritise resources of all their hotels.

Paradigma develop a platform to compare data collected from the Internet with the corporate data of turnover of each hotel, its CAPEX & OPEX . Reports are presented on an online interactive website

Metrics and KPIs are reported on interactive tables and plotted on graphs. It easy to understand and drill in search of details.

NH Hoteles can evaluate the impact of investments and measure their ROI. They can also predict now the cost of improving the online reputation of their investments.

They can compare and monitor the data of a given hotel with other hotels of the same chain in the same city or country

Example of Balanced score

Flexibility is the most powerful feature of the Quality Focus online tool

NH Hotels can customise the queries on the database without Paradigma's intervention. The quality team can define new aggregation data simply by uploading spreadsheets with new categories.
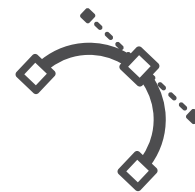
NH Hoteles can for instance define the benchmarking of a self-defined group of hotels at local, regional and national levels and with specific hotels of competing franchises **without any help by Paradigma's developers.**

Example of a score quadrant
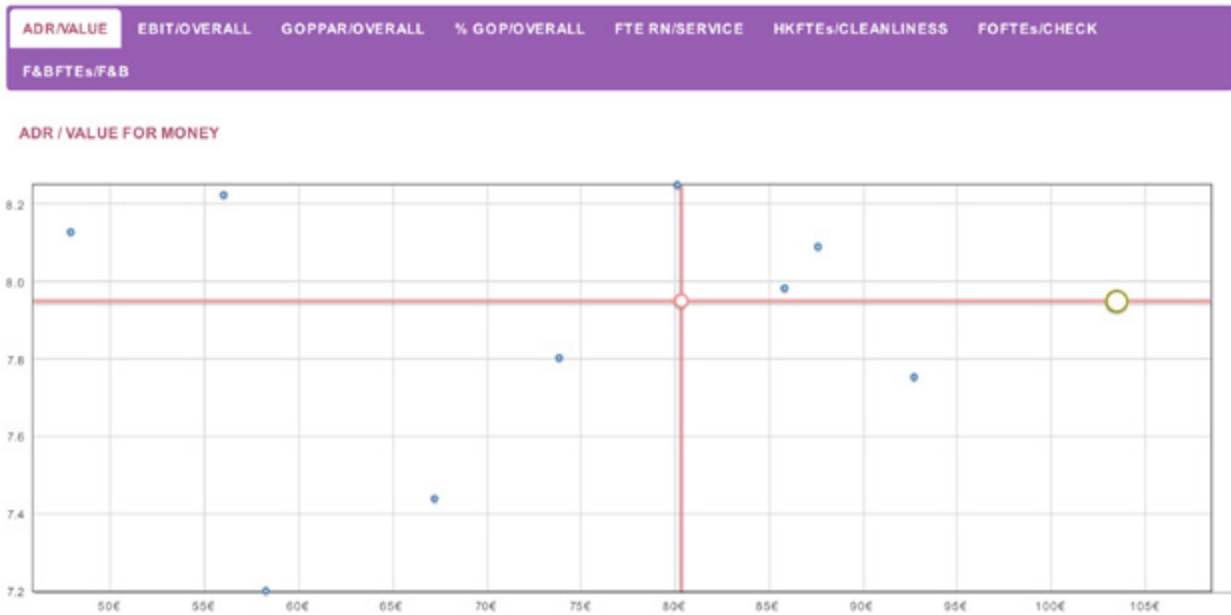
Correlation of quality ratings with hotel revenue
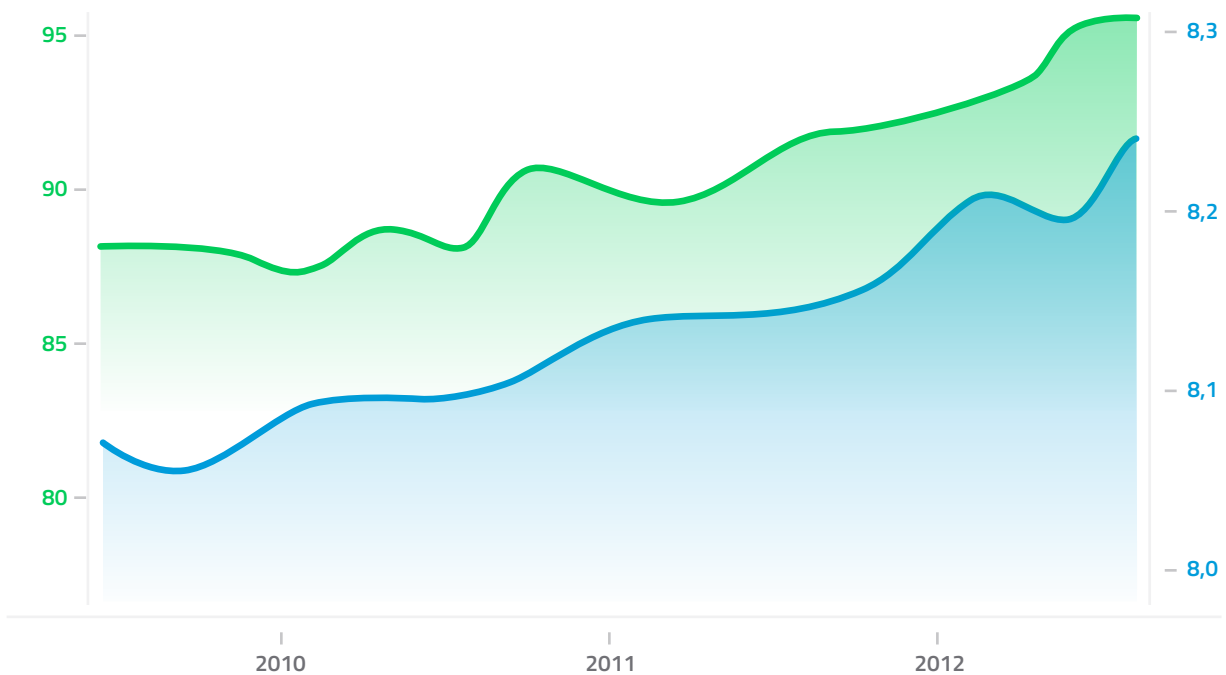
3 Results

Results after 2 years with Paradigma

NH Hotels' management measured the direct correlation between expenditure (capex and opex) and customer satisfaction. The metrics of the tool earned the trust to help in decision-making at the top level of management.

200k **reviews aggregated and processed per year**

400 **hotel directors world-wide use the tool more than twice a week on average to gauge performance and to identify to make informed decisions**

15% **of the variable income of employees is performance-dependent as measured by the Quality Focus Online tool**

20% **less negative reviews from one month to the next by implementing free Wi-Fi access in every hotel**

A side-effect of the tool was a better positioning and visibility of NH Hoteles in the reviews sites and bookings portals.

4 Endorsement

Testimonial

> " *The tool turned out to be easy to use from day one. It helps me save a lot of time and improve the business. We improved our noise insulation that to detecting this issue on the tool and as a consequence the satisfaction scores improved overnight, like they did when we installed Wi-Fi.* "

Javier Mármol, Director of the Hotel NH Palacio de Tepa in Madrid, Spain

Alejandro Aranda, Quality & Competition Corporate Manager at NH Hoteles

> " *Competition is intense. Service and value for money are crucial in our segment. Paradigma listened to our needs and developed just the right tool. Our top management can now make decisions in operations and investments almost in real time.* "

5 Conclusion

NH Hoteles were pioneers in turning social media into a powerful Business Intelligence resource.

- Guests' reviews and NH Hotels financial data feed the key strategic decisions of the business.

- We turned noise into fuel for the business.

- Social signals are no longer wasted.

- Investment decisions have now an immediate and measurable impact.

Click on play to watch the case study

{ paradigma