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Almost three-quarters of the administrations surveyed (72 per cent) report that analysing data is becoming more important in their own work.

At present, there is a clear correlation between the technical demands of data analysis and its dissemination: Almost all public sector administrations use simple IT tools for analysis, but only 17 per cent are engaged in advanced data analysis using new technologies. However, a further 38 per cent are currently discussing their use. Large central German government agencies are pioneers in this area.

Depending on the type of data analysis used, 80 to 100 per cent of public administrations are satisfied with the results. The more complex the data analysis, the higher the satisfaction shown.

Less than half of administrations believe they are already regularly converting their data analysis findings into specific, demonstrable benefits. Other administrations have only observed direct effects such as improved criteria for decision-making, reduced risks or individual services in some cases.

66 per cent of administrations that have not used advanced data analysis to date report privacy concerns as one of the reasons for this non-use. A good third of them lack technical and staffing resources.

49 per cent of administrations are open-minded about the concept of Big Data. Only three per cent view it critically and oppose its use. By their own account, one third are already using Big Data solutions. Almost two thirds expect the topic to become more important within their own organisations in the next three years.
3 megatrends dominate the agenda for federal, state and local governments

Digitisation remains the greatest challenge for public sector administrations. One reason for this is that e-government legislation has not yet been fully implemented. There is also a great deal of catching up to be done with regard to IT security, which is one of the key future public sector tasks.

Providing care for the numerous refugees in the country is another top priority for administrations. The large influx of people fleeing persecution puts strong pressure on authorities to act, because the associated financial burdens on the federal, state and local authorities cannot currently be calculated.

The consequences of demographic change are being felt by public administrations themselves when it comes to their own junior staff. The declining numbers of young people entering the profession make it more difficult to recruit new personnel and aggravate the shortage of skilled workers seeking employment with these authorities.

Viewed against this backdrop, digitisation presents a great opportunity for public authorities. However, it also presents administrations with technical and organisational challenges. As a result, issues such as process management and reorganisation are becoming increasingly more important.
Promising prospects for the future: Service accounts, Big Data and e-Participation

Many public authorities now offer portals with specialist information for both companies and individuals. However, in order to ensure that the population as a whole will be able to take advantage of these administrative services in the future, e-participation in the form of interactive processes will be crucial.

In the future, individuals will be able to look forward to a wide range of digital services: from digital invoicing and payment to forms of dialogue for civic participation in decision-making. Many administrations are planning to introduce service accounts, which in particular are expected to improve the targeting of administrative processes to the needs of individuals and businesses alike.

Digital processes generate increasing amounts of data and thus the question arises as to how this information can be evaluated. This is why federal and state authorities as well as large municipalities see good opportunities for Big Data and data analytics. Possible areas of application include the more precise prediction of long-term framework conditions and the need to take action, e.g. for planning residential areas, transport connections and social facilities and services.

More services, less costs
For 89 per cent of authorities, service costs are the future of digital administration.

More forecasts and services for individuals
Approximately one in two authorities would like to use Big Data and data science faster in the event of catastrophes.

Greater public accessibility
42 per cent of cities and municipalities involve citizens in the making of decisions.
Traffic planning and control

Example project: Smart Parking London

Currently, traffic planning is probably the most common public use of Big Data analytics.

For example, data from video sensors, mobile phone cells and ticket systems such as the London „Oyster Card“ scheme are used to monitor and later simulate traffic flows or even react to disturbances in real time. And in addition to other areas, such data is special because of its singularity; that is, its traceability of individual travel routes.

In road and rail maintenance, aggregating large amounts of data is useful: vibration sensors in vehicles and infrastructure, for example, help in the early detection of road damage. This makes it possible to repair damage more cost-effectively while at the same extending inspection intervals.

Use Case

Imagine having to look for a parking space in a massive metropolis such as London. Just like the inhabitants of German cities, Londoners often have to park their cars a several blocks away from their homes or workplaces. Urban planners are dealing with this problem by considering the use of underground car parks. This does, however, necessitate the ripping up entire streets to complete such projects.

The „ParkRight“ app offers a very simple solution for this problem. This free app informs you which car parks in your near vicinity are full or have available spaces. As a pilot project, the streets of London’s Westminster district were equipped with detectors that scan the parking situation and transmit this information to the users’ smartphones when they are in the area.

Challenges

– The accuracy of the sensors.
– The delay between a sensor scanning a space and this being passed through the wireless network.
– Getting real-time analytics.

Advantages

– Drivers will be able to find a parking space in less than 10 minutes. This means less stressful driving, because users know they will find a parking space at their destination.
– The app, incidentally, is also useful in faster moving traffic areas. Co2 emissions are also reduced as a result of its use.
Why Pentaho?

- Pentaho is open-source based
- Quick, straightforward implementation of the software
- Broad and comprehensive Big Data integration platform
- Solutions can be developed and delivered in an agile manner
Public safety

Example project: The German Federal Police

Use Case

Using the open-source tool Pentaho Data Integration, this federal agency consolidates data from various systems into the data warehouse and prepares it for uniform presentation. This includes more than twenty areas of operation, such as border crossings, asylum seekers and crime.

This consolidated database is used to prepare reports and evaluations for the Federal Police Central Headquarters, the Federal Ministry of the Interior, the Bundestag, the EU Commission and the EU border protection agency Frontex.

Challenges & Requirements

– The time-consuming Excel reporting composed of 70+ Excel sheets including statistics is to be replaced.
– Integration of different source systems.
– Quality assurance measures due to poor data quality in some source systems.
– User-friendliness/flexible queries for users by using a self-service approach.
– Automation of processes, low system maintenance.
– Acceleration of the information delivery process.

Advantages

– Faster information delivery: Queries from Parliament and other institutions can now be answered with just a few mouse clicks – activity that previously required days of data preparation.
– Higher data quality for accurate decision making: Thanks to quality assurance at the ETL level.
Research and Development

Example project: CERN

Use Case

CERN is the biggest research organization in the world. With more than 15,000 users, CERN faces very specific challenges in the area of business computing especially the areas of data warehousing, business intelligence and reporting.

To manage the required data and contents, CERN bases its entire business computing on Pentaho including data integration, reporting, analytics and dashboards. This makes CERN one of the biggest Pentaho implementations worldwide.

Challenges & Requirements

- Providing and processing content to 15,000 users.
- Controlling all content created by CERN.
- Abolishing manually crafted PL/SQL and shell scripts for ETL processes.

Advantages

- Accelerated business computing by using one single solution for all aspects of data and content management.
- Replacing manual work with ETL and data processes.
- Better control of several millions of contents.
- Independent of databases and data systems as Pentaho can be used with any kind of data source.
The Social Sector

Example project: The German Federal Employment Agency

Big Data at the GFEA: Development and analysis of online data to understand labour market behaviour.

Use Case

The project is intended to open up new opportunities for scientifically evaluating Big Data taken from GFEA digital systems. The GFEA job exchange is an online labour market that employers and employees can use to search for job and training opportunities.

The VerBIS system („Placement, Advice and Information System“) is the internal software system used by employment agencies and job centres as well as the GFEA employer service. Regardless of user, VerBIS can be used to ascertain the number of visits to certain pages over time and attribute these to employers or employees and/or administrative or agency activities.

Another interesting aspect is that the behaviour of a third actor – employment agencies as a whole – can be included in empirical analyses for the first time. This offers the opportunity to learn much more about how the labour market functions.

Advantages

- Using measurements to gather insights on the extent to which actors are using the labour market search.
- Detailed knowledge on how jobseekers and employers react to economic fluctuations.
- Further data from the job exchange will be made accessible for scientific use in the future.
Why Pentaho?

- Self-service analytics
- Flexible data integration
- Dashboards
- Agile implementation
Example project: Vienna Public Housing Customer Service

In several U.S. cities, sentiment analyses in social media are used in conjunction with systematic evaluations of calls to the 311-hotline (complaints to the city administration) to identify gaps and shortcomings in public services and infrastructure.

Because of a change in perspective from vendor-driven to demand-oriented performance management, such approaches are also referred to as „customer-driven governance“.

Use Case

Vienna Public Housing Customer Service is the largest municipal property management company in Europe and manages approximately 220,000 communal flats, 47,000 parking spaces and over 5,100 inns. The company uses Pentaho and its data analysis and reporting features to address its quality assurance needs. This ranges from personnel planning and the evaluation of tenants‘ concerns to professional systems monitoring.

A large number of cubes, metrics, dimensions and reports help in analysing company performance and in deriving improvements based on key performance indicators.

Challenges

- Integration of a wide variety of data sources into a data warehouse
- Focus on self-service analytics
- Realisation using an agile implementation methodology

Advantages

- Monitoring of customer queries
- Quality assurance of data by using ETL processes
- Self-service analytics by professional users
Why Pentaho?

- Pentaho is open source
- Flexible data integration
- Low support costs
- Agile implementation
Increased Efficiency & Administrative Reform

Example project: RSAG AöR

Use Case

RSAG’s central area of responsibility is materials management: this includes receiving residual waste, paper, bulky waste, etc. at disposal facilities via collection vehicles or, for example, the delivery of bulky waste by private households. This also involves outgoing material flows, i.e. the transfer of recyclable materials to further processing companies, waste incineration plants or final waste disposal landfills for mineral substances. The incoming and outgoing materials are weighed and the data recorded in the TRAS software solution.

TRAS, which is used across the industry, not only records the material flows, but is also used for organising the storage sites for and quantities of recyclable materials. It is also used to coordinate the routes used by the collection vehicles. This data, however, remains in TRAS; the information is not exported to a reporting system or any analysis software to monitor inventory or material flows.

The same applies to the ERP system: In addition to other functions, RSAG uses SAP to determine the fees charged by municipal customers as well as to determine the actual costs of running the vehicles used.

Challenges

- Data inconsistencies, cleansing of information sources.
- Growing number of data sources.
- Finding a solution with low maintenance costs.

Advantages

- The data warehouse is a central and consolidated company data source that is Pentaho based and integrates existing data sources (SAP, TRAS industry-wide solution).
- Business development information is available at the touch of a button.
- Accurate forecasts for developing individual business areas can now be made.
- Business-oriented data preparation for the sales, engineering, finance and IT departments.
- High user acceptance thanks to an intuitive web interface, high query speeds, automated data integration and reporting and the ability to work more easily.
Why Pentaho?

- Pentaho is open source-based
- Quick and easy installation thanks to a seamless connection to the existing IT infrastructure
- Broad and comprehensive Big Data integration platform
Optimising Tax Collection
Example project: HMRC

Use Case

Because of a cost-cutting plan imposed from above, Great Britain’s tax collection authority HMRC was forced to find savings.

- By optimising the data warehouse, the aim was to reduce operating costs with the goal of saving £20 million per year. This was to be achieved through consolidation and by reducing license costs.

It was also expected that sales should be increased.

- £34 billion of potentially unrecorded revenue had been missed by this authority and was to be secured by improving data quality.

Challenges

- Inconsistent data across 11 different data warehouses.
- Different key performance indicators across teams.
- Consultants were hired to achieve individualised reporting, resulting in long lead times.

Advantages

- 40 reporting streams have now been consolidated and are available to users as self-service reporting.
- Thanks to Pentaho’s agile framework, departmental datamarts can now be set up in weeks instead of months.
- Pentaho was also used in other areas of the company with a Business Intelligence Competence Centre even being set up.
## The benefits of Big Data for the optimised collection of taxes

<table>
<thead>
<tr>
<th>Development</th>
<th>Adaption</th>
<th>Progress</th>
<th>Best Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>➤ Big Data awareness begins.</td>
<td>➤ More sophisticated Big Data tools support data discovery and visualisation.</td>
<td>➤ Big Data facilitates compliance activities, business processes and taxpayer services. It also supports transactions.</td>
<td>Big Data is used in real-time or nearly real-time:</td>
</tr>
<tr>
<td>➤ Some ad-hoc queries and visualisations are based on descriptive analyses.</td>
<td>➤ Especially when it comes to analysing and managing compliance risks as well as providing service-oriented solutions.</td>
<td>➤ For individual taxpayer tax assessments.</td>
<td>➤ For the provision of various services.</td>
</tr>
<tr>
<td>➤ They are not, however, necessarily used to identify emerging trends.</td>
<td></td>
<td>➤ To gain an overview of returns that have either not been realised or have been achieved in advance.</td>
<td></td>
</tr>
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<td></td>
<td>➤ Experiments related to merging different data sources.</td>
<td>Data from several channels – including social media – are used to...</td>
<td>➤ Non-traditional data is taken into account in risk models to highlight non-compliance or to improve services.</td>
</tr>
<tr>
<td></td>
<td>➤ New analytical tools and digital services are implemented.</td>
<td>➤ gain a better understanding of taxpayer behaviour and needs.</td>
<td>➤ Structured and unstructured Big Data sets are used to support all business processes across all revenue streams.</td>
</tr>
<tr>
<td></td>
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<td>➤ manage risks.</td>
<td>➤ Especially for case identification, selection, compliance audits and decision-making.</td>
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<tr>
<td></td>
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<td>➤ improve bespoke services.</td>
<td>➤ Structured and unstructured Big Data sets are linked together to support business processes in some or all parts of tax administration.</td>
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<td></td>
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<td>➤ increase responsiveness.</td>
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Why you should speak with it-novum...

We are leveraging these business intelligence and big data benefits to businesses:

▶ 360-degree view of your customers
▶ Specialist departments evaluate Big Data data themselves thanks to self-service analytics
▶ Identification of new revenue sources through intelligent use of company data
▶ Cost savings through the use of a data warehouse
▶ Avoiding the time-consuming and error-prone Excel mess

If you want to use these benefits in your business, we should get to know each other!

it-novum offers extensive services for your big data analytics project:

▶ Data engineering
▶ Implementation of data warehouses and data lakes
▶ Pentaho/SAP Connector for processing SAP data
▶ Pentaho/HVA Connector for video stream analytics
▶ Predictive analytics and machine learning
▶ Dashboards and data visualization
▶ Embedded analytics

Leading in Business Open Source solutions and consulting

it-novum is the leading IT consultancy for open source based business solutions in the German-speaking market. We operate from our main office in Fulda and branch offices in Dusseldorf, Dortmund, Vienna and Zurich to serve medium and large enterprises as well as the public sector.

As Hitachi Vantara Preferred Partner for Big Data Insights and IoT we are experts in using Pentaho. With our expertise in consulting, training and support we help companies to generate insights from their data and to make their data-driven projects successful

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