

DATA SERVICE CARDS



DATA SERVICE CARDS

Welcome to the world of data-driven innovation

For many companies it is a challenge to find the data sources that benefit their business.

The **Safe-DEED Data Service Cards** help you to create your new data-driven services. You'll do this by combining data sources, analysis methods and customer benefits.

In this card set, you find the instructions on how to select and combine the cards. As an extension, you can use the **Data Service Cards** in combination with the **Safe-DEED Data-Driven Business Canvas**. Both tools were developed within the EU H2020 project Safe-DEED under grant agreement No 825225. Special thanks to the Green Tech Cluster Styria for their support in design, layout and testing.



European Commission

Horizon 2020
European Union funding
for Research & Innovation

QUICK GUIDE

50 cards for the systematic development of data-driven services

Data-driven services create benefits for your customers, optimize your processes and bring additional value.

How to use the Data Service Cards?

Use the 50 cards as inspiration in the development process of data-driven innovations. The combination of data sources, analytics methods and customer benefits create your new data-driven services.



Through selection & combination
new data-driven services
are created



Source

Analytics

Service

Benefit

Revenue



QUICK GUIDE

Apply the card deck in different ways

Place category explanation cards on the table ordered by 1) Data Sources, 2) Data Analytics, 3) Data Services, 4) Benefits, and 5) Revenue Models.

Develop a new data service:

- Discuss all cards per category in the group and select a maximum of 3 cards per category
- Two sequences have proven to be promising:
 - Start with 1) Data Sources → 2) → 3) → 4) → 5)
 - Start with 4) Benefits → 3) → 2) → 1) → 5)
- Discuss the developed data service and check the consistency

Further development of an existing service:

- Try to rebuild your existing service based on the 50 cards
- Discuss all cards per category (order does not matter) whether it makes sense to consider the card with regard to additional customer benefits
- Discuss the developed data service and check the consistency



**Be creative:
Find your own ways to apply the cards**

DATA SOURCES

Data sources are the place where data is generated. Depending on the industry and business model, every company has different access to data sources.

In this category you will find 10 selected data sources that can be individually distinguished between internal and external and existing and new data sources.

To identify the data sources, you can ask yourself the following questions:

Internal Data:

- What data do we receive from our processes?
- What data can our product or service generate itself?

External Data:

- What data do we receive from our suppliers, partners or customers?
- Which data can we use from data marketplaces?

Our tip:

Start by identifying internally available data sources. Use the 10 cards as inspiration. Based on this, develop further options for the use of external or new data sources. They support the above questions. At the end you will have a list of your more available or potential data sources.

DATA SOURCES



DATA ANALYTICS

Data analytics offer new insights based on data, creating additional value for customers. The analytic methods applied depend on the amount and quality of data. This category contains 10 data analytic methods.

The path from data to useful information is challenging. It often requires a complex analysis to gain a competitive advantage. Therefore, you should ensure sufficient depth of the appropriate analytic methods for your data sources.

Even if a data source turns out to be a dead end in the beginning of the data analysis process, new technological possibilities can suddenly turn it into the driving force for the development of new services.



Our tip:

Take sufficient time to select the appropriate analytic method for each data source you have selected. You should always focus on the benefits generated for your customer or your organisation.

DATA ANALYTICS



DATA SERVICES

A data service describes the way in which the added value created via data is made available to customers. Depending on the desired benefit, various forms of data services may be applied.

In this category you will find 10 well-known examples that you can use as an inspiration for developing your individual data-driven service.

Successful data-driven services are often based on a combination of various types of information from multiple data sources. This innovative combination enables you to create additional value for your customers.

If possible, consider all previously selected data sources and try to connect all kinds of information with each other.



Our Tip:

Several services or combinations can be developed using most data sources. Try to think as broadly as possible and don't commit to an idea too quickly. Ultimately, the customer decides which service is perceived as particularly useful.

DATA SERVICES



BENEFITS

A data benefit describes the additional value generated by a data service provided. A data benefit derived from addressing the customer's needs plays a leading role in the systematic development of new data-driven services.

In this category you will find 10 examples of customer benefits based on data-driven services.

Various approaches can be chosen when exploring data benefits: the benefit can be derived directly from addressing the customer's needs or developed out of a service idea based on data sources and analytics methods.

The following questions will help you in this regard:

- Which information is particularly relevant for your customers?
- Which customer needs does the data service address?



Our Tip:

Findings from the developed data service can provide added value in several places, for the company itself, for existing customers or for new target groups. Therefore, for each service idea generated in advance, take sufficient time to consider what added value is created for whom.

BENEFITS



REVENUE MODELS

A revenue model can be defined as a logic of what, when, why and how delivered value is transformed into earnings.

There are different criteria by which revenue models can be distinguished such as by the product or service which is being sold, by the role of the customer, by the way the value is determined or whether the revenue is generated directly or indirectly.

The 10 revenue model cards provide inspiration on what pricing strategy is suitable for your data service.



Our Tip:

Besides the well-known models like subscription or pay per use, check out also possible alternatives e.g. paying with data or combine suitable revenue models

REVENUE MODELS



DATA SOURCES



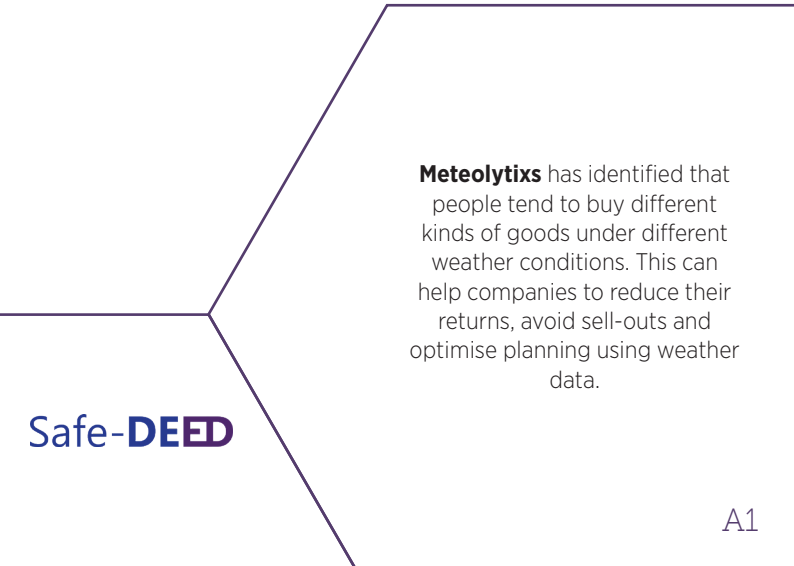
<https://www.gettyimages.com>



Weather Data

Weather Data

This data includes historical weather data, weather forecasts, temperature, humidity, dew point temperature, air pressure, amount of precipitation, hours of sunshine, global radiation, wind direction, wind speed and snow depth.



Meteolytix has identified that people tend to buy different kinds of goods under different weather conditions. This can help companies to reduce their returns, avoid sell-outs and optimise planning using weather data.

DATA SOURCES



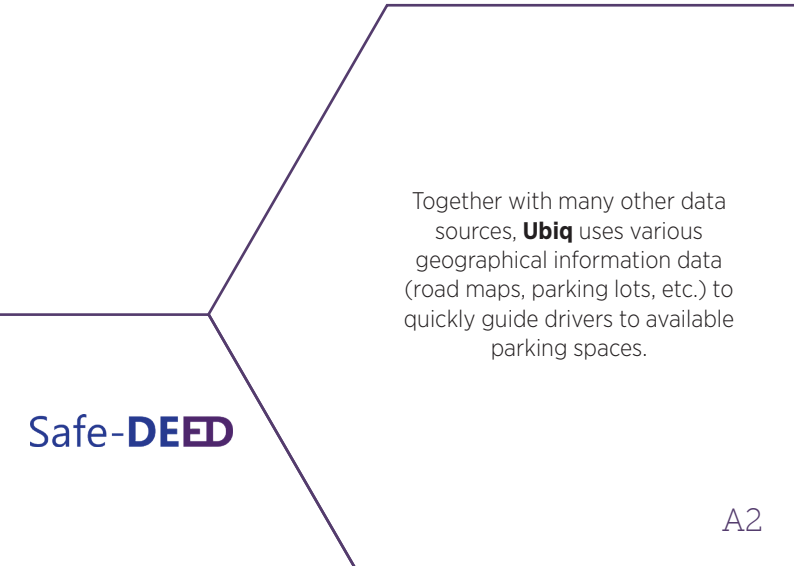
Image: istockphoto.com

Geographic Data



Geographic Data

This data includes road maps, water maps, hiking trails, cycle path networks, railway lines, supply lines (water, gas electricity, district heating), land use plans, sewer, cadastral, environmental data, cell towers and traffic data.



Together with many other data sources, **Ubiq** uses various geographical information data (road maps, parking lots, etc.) to quickly guide drivers to available parking spaces.

DATA SOURCES



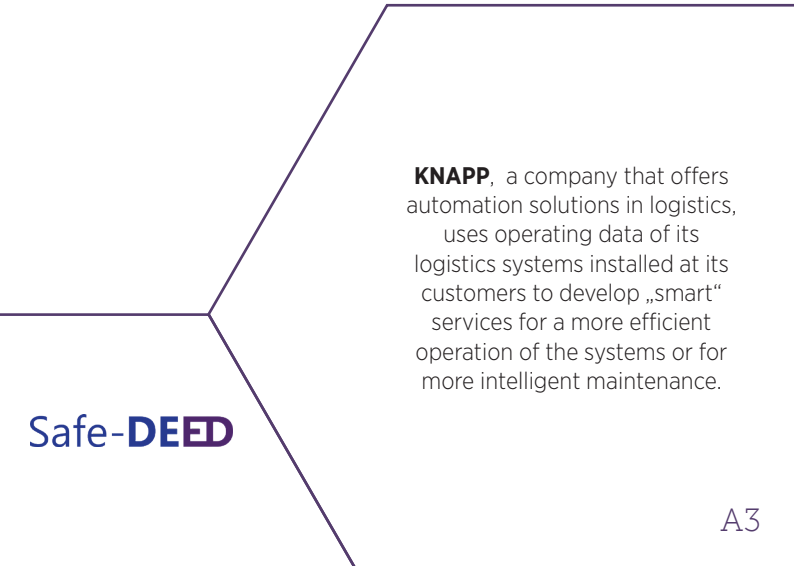
Image: istockphoto.com

Product-generated Data



Product-generated Data

This data includes operating time data, downtime, error status, energy consumption, setting data, wear data, sensor data and ambient conditions (temperature, air pressure, humidity).



KNAPP, a company that offers automation solutions in logistics, uses operating data of its logistics systems installed at its customers to develop „smart“ services for a more efficient operation of the systems or for more intelligent maintenance.

Safe-**DEED**

DATA SOURCES

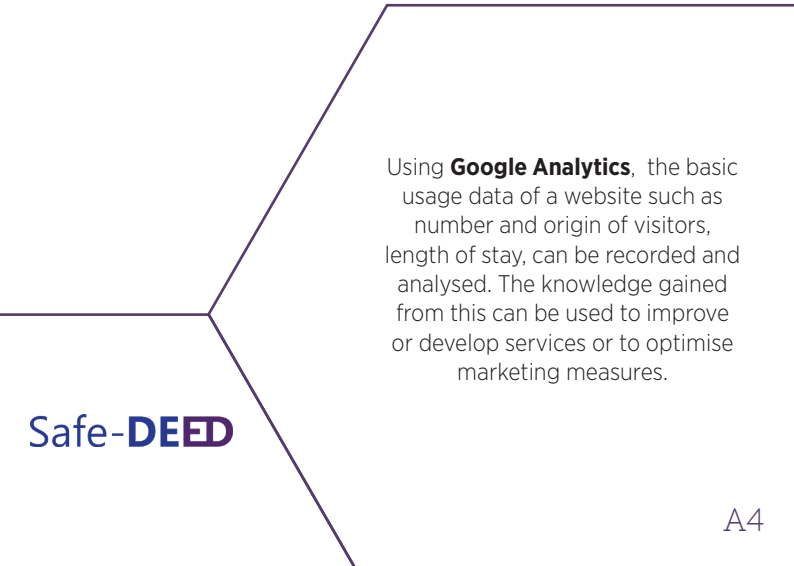


Image: istockphoto.com

Usage Behaviour

Usage Behaviour

This data is generated by observation and recording when using products and services, for example, via cameras, customer cards, payments with credit or debit cards, cookies on websites, Internet browser data and smartphones or apps.



Using **Google Analytics**, the basic usage data of a website such as number and origin of visitors, length of stay, can be recorded and analysed. The knowledge gained from this can be used to improve or develop services or to optimise marketing measures.

DATA SOURCES



Web Content

Web Content

The Internet as a source of data is almost inexhaustible and can be used systematically to search for information. With the help of special computer programs (crawlers), the World Wide Web can be automatically searched for specific content, such as keywords, offers, e-mail addresses and links.



The **TRENDONE** Trend Explorer systematically searches the web with the help of web crawlers to discover trend-setting products, services or technologies. This information is made available to customers in a user-friendly way, so that they can react early or serve as a source of inspiration.

DATA SOURCES



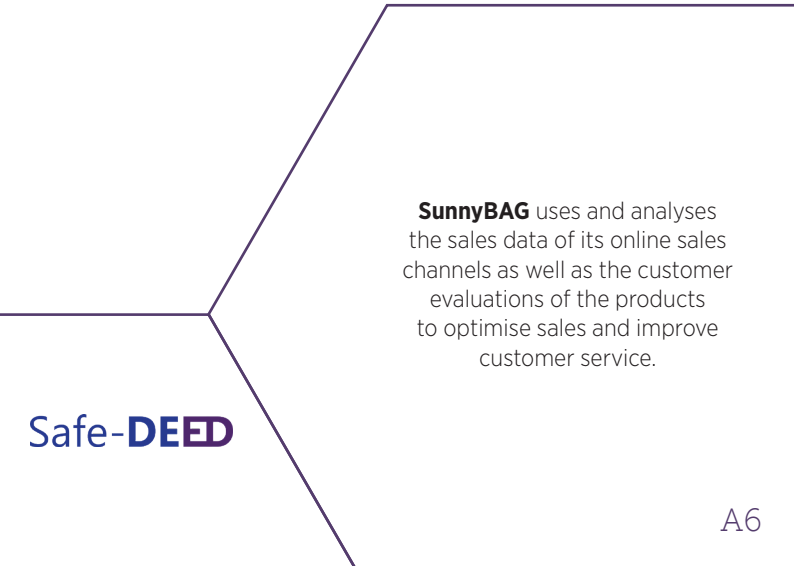
Image: istockphoto.com



Marketing & Sales Data

Marketing & Sales Data

These data sources originate from internal sources such as ERP systems, as well as from external sources (web, customers, competitors). They include sales data, price, customer data, customer statistics, customer ratings, market share and trends.



SunnyBAG uses and analyses the sales data of its online sales channels as well as the customer evaluations of the products to optimise sales and improve customer service.

DATA SOURCES

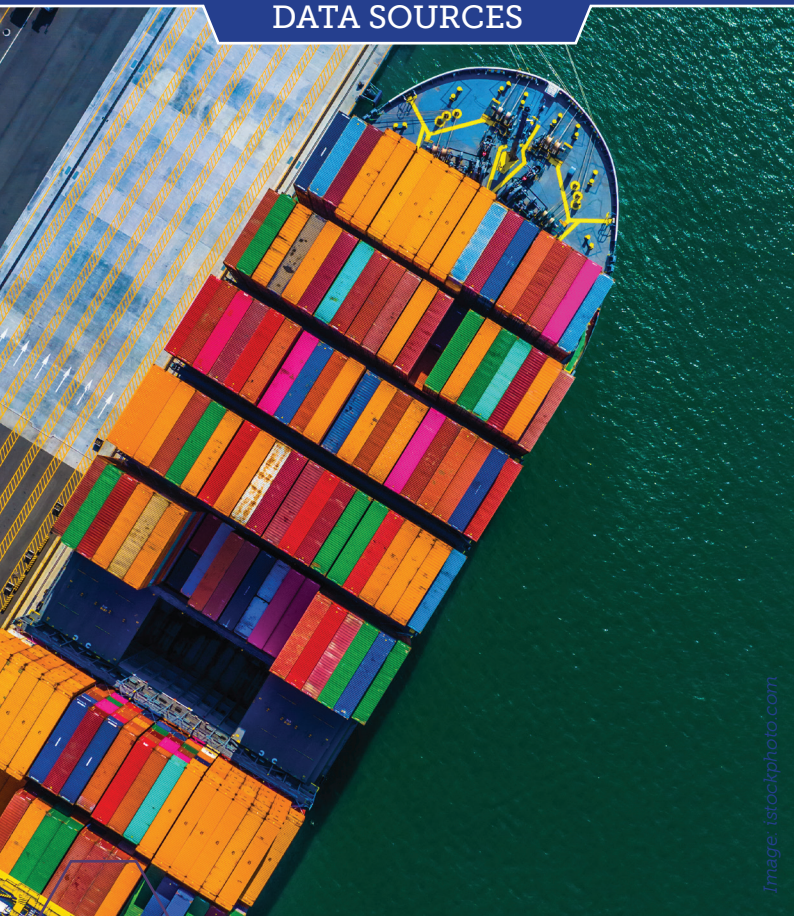



Image: istockphoto.com

Logistics & Mobility Data

Logistics & Mobility Data

This data can be provided directly by mobility providers, logistics service providers or individual transport users, e.g. traffic data, timetables, route information, capacity utilization, road conditions, travel times and fleet data.



The **Bike Citizens** bike-app uses anonymously collected mobility data from cyclists to continuously improve the cycling infrastructure in urban regions.

DATA SOURCES




Image: istockphoto.com



Process Data

Process Data

Creating products or services in companies typically generates various process data, including measurement data, quality data, throughput times, machine and system data, log data, control data and status messages.



Amazon stores each delivery and categorises it according to various factors. For example, by delivery location, time, date, season. This allows the estimation of the delivery time to be continuously improved. In this way, parameters relating to new delivery locations can also be reliably estimated.



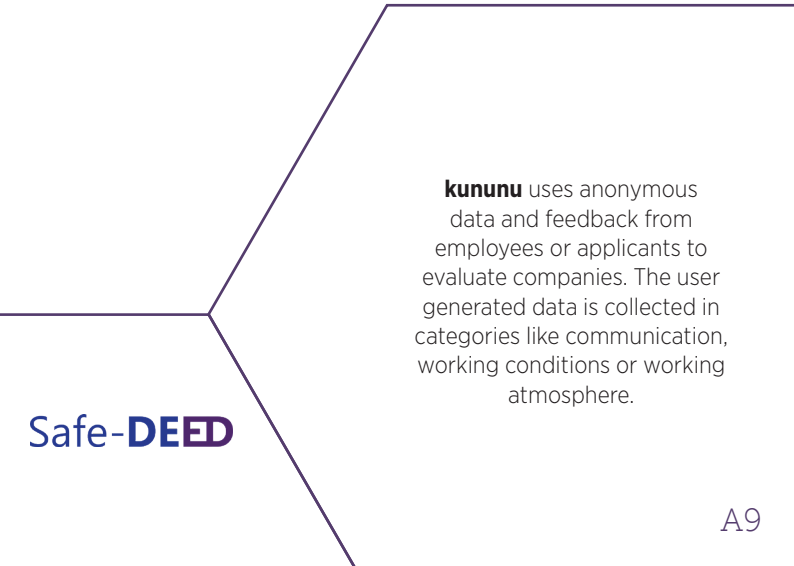
Image: istockphoto.com



User-generated Data

User-generated Data

User-generated data or content data is created when users upload content themselves, e.g. by leaving comments, sharing pictures on Facebook, blogging, uploading videos to Instagram or YouTube and posting reviews on Amazon or TripAdvisor.



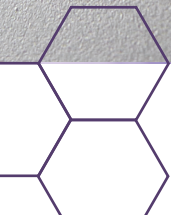
kununu uses anonymous data and feedback from employees or applicants to evaluate companies. The user generated data is collected in categories like communication, working conditions or working atmosphere.

Safe-**DEED**

DATA SOURCES



Image: istockphoto.com



Open Data

Open Data

Open data is contained in all databases that are freely accessible in the general interest of society without any restriction for free usage and distribution. This includes demographic data on the population, data from traffic, the environment, geography and research.



Yelp, an application that connects people to restaurants and other businesses, uses open municipal health inspection data to inform users about the hygienic quality of a restaurant.



Image: istockphoto.com



Reinforcement Learning

Reinforcement Learning

Reinforcement Learning tries to solve a given problem by enabling self-acting software agents to learn strategies. Incentives for good solutions are provided by a reward function. This group of algorithms performs well when applied to problems where the problem state can be observed and evaluated after every single action.

To get a better understanding of how these algorithms work, imagine using trial and error to figure out how the remote of your new TV works.

DeepMind Technologies, now acquired by **Google**, drew attention to itself in 2016 with AlphaGo when it beat Go World Champion Lee Sedol in 4 out of 5 games. In 2019, Google DeepMind announced that the AlphaStar software could beat 99.8% of the player base of Blizzard Entertainment's real-time strategy game Starcraft II, which is very popular in the competitive e-sports scene.

Safe-DEED



Image: istockphoto.com

Classification

Classification

Classification algorithms learn how to assign different objects into predefined categories based on known, often historical data. The algorithms require training data with known class assignments.

Application examples are spam filters, which classify unread messages as spam / non-spam, and predictive classification models, which proactively classify errors based on machine data.

Modern e-mail accounts are a prime example of classification. In 2015, **Google** claimed that its Gmail spam filter correctly removed 99.9% of spam. At the same time, only 0.05% of emails are incorrectly classified as spam.



Cluster Analysis

Cluster Analysis

The aim of cluster analysis is to find structure in unstructured data.

Cluster algorithms do so by forming groups of similar objects.

Parameters are used to determine the similarity between the objects. The groups themselves are not known in advance and are formed depending on the selected distance measure and attributes. For example, text documents could be grouped according to their language, main topics and size (number of words) or some grammatical properties. In addition, many clustering algorithms allow the number of groups or clusters to be specified.

Rapidis, a Danish provider of software solutions in the transportation sector, offers route optimisation software for such scenarios as waste collection, postal delivery and parcel delivery. Since the problem is too complex to be calculated for large areas, clusters are calculated and used to divide addresses into areas (or address clusters) in advance. For these clusters, it is then possible to calculate the optimal routes within a reasonable time and using adequate resources.

DATA ANALYTICS



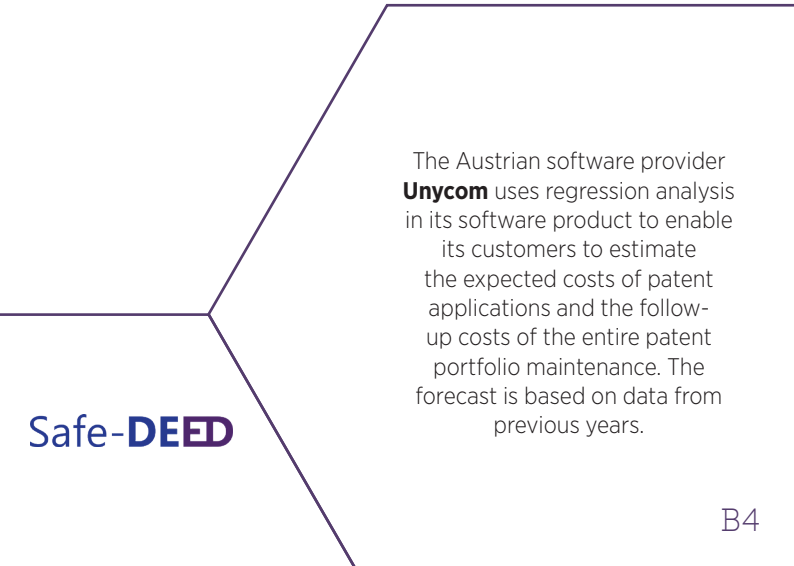
Bild: istockphoto.com



Regression Analysis

Regression Analysis

Regression analysis uses known and labelled data to learn to estimate continuous values. Regression analyses require training data labelled with known target values. Regression analysis is often used to predict future values based on historical data. Examples of applications are predictions of stock prices or sales forecasts.



The Austrian software provider **Unycom** uses regression analysis in its software product to enable its customers to estimate the expected costs of patent applications and the follow-up costs of the entire patent portfolio maintenance. The forecast is based on data from previous years.

DATA ANALYTICS

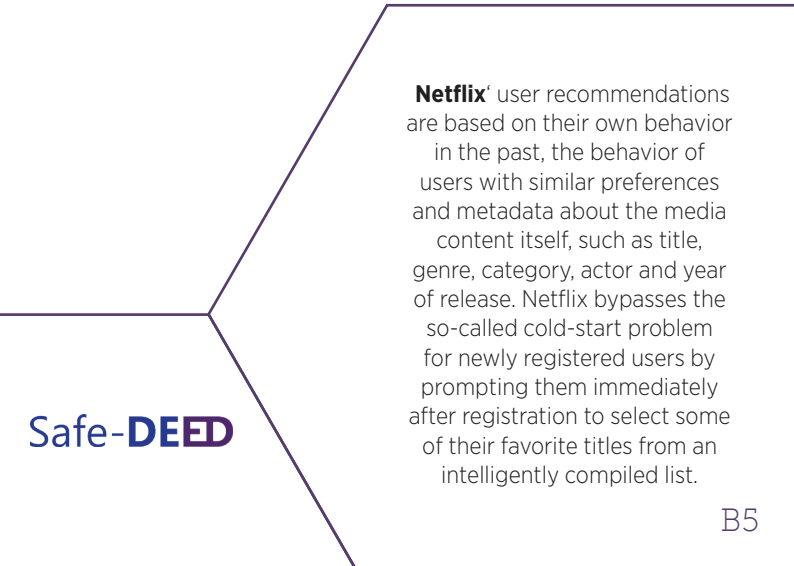


Image: istockphoto.com

Recommender System

Recommender System

Recommender systems are filters that apply information collected about users and their behaviour to determine the users' interests and generate recommendations. These recommendations should meet the customer's needs as accurately as possible to increase customer satisfaction.



Netflix' user recommendations are based on their own behavior in the past, the behavior of users with similar preferences and metadata about the media content itself, such as title, genre, category, actor and year of release. Netflix bypasses the so-called cold-start problem for newly registered users by prompting them immediately after registration to select some of their favorite titles from an intelligently compiled list.

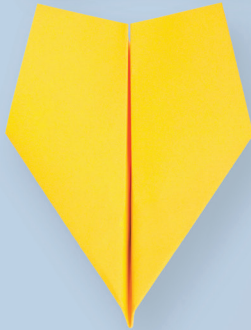


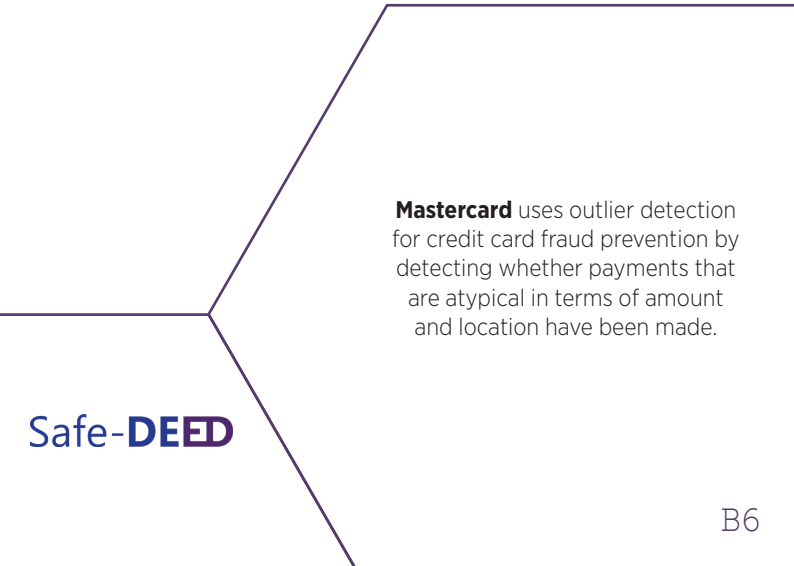
Image: istockphoto.com



Outlier Detection

Outlier Detection

In outlier or anomaly detection algorithms are deployed to detect anomalies by analysing the data. An anomaly can be a global outlier, such as an extreme measurement within a series of measurement, or consist of context-dependent or collective outliers. Outlier detection is used to monitor the condition of machines, perform medical examinations, detect fraudulent credit card transactions or remove image artifacts during the post-processing of a photo.



Mastercard uses outlier detection for credit card fraud prevention by detecting whether payments that are atypical in terms of amount and location have been made.

DATA ANALYTICS

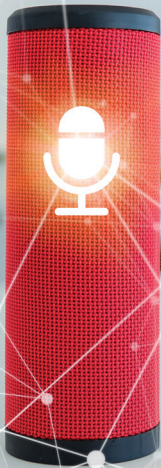


Image: istockphoto.com

Natural Language Processing

Natural Language Processing (NLP)

Natural Language Processing (NLP) combines linguistics and computer science to process and understand natural language data, such as text documents and voice recordings. Rules and algorithms are used to process large amounts of knowledge automatically or to provide natural human-computer interaction.

Google applies NLP in a variety of areas. Google's wizard uses NLP methods to determine the information needs of the user. The search engine uses NLP to find similarities between documents, to display structured information from web pages in info boxes and to list similar questions. Another application area is the machine translation service Google Translate.

DATA ANALYTICS



Association Analysis

Association Analysis

Association analysis is used to analyse transactions of items. A simpler approach termed frequent pattern mining identifies objects that are frequently observed together, e.g. items in shopping cart. Association rule mining additionally determines which items imply the presence of other items. These implications are represented in the form of association rules. Retailers use such algorithms to optimise the positioning of their products in stores or identify the optimal products for promotions.

To speed up the web page loading, **Mozilla's web browser Firefox** estimates in advance which links the user is most likely to click on next. To that end, Firefox uses association analysis to identify frequent combinations or sequences of web pages in the surfing behavior. In a retail analogy, web page views represent products and a „surfing session“ corresponds to a shopping cart (or market basket).

DATA ANALYTICS



Image: istockphoto.com



Descriptive Statistics

Descriptive Statistics

Descriptive statistics provide a quantitative description of collected data. A sample can be summarised and observations explored using measures of central tendency, variability and dispersion. Examples are mean or median, standard deviation, minimum and maximum, and the skewness of a sample. Descriptive statistics is also used to provide easy-to-understand visual descriptions of a data sample, e.g. via box- or scatter plots.

Facebook Data Analytics

provides metrics and descriptive statistics for companies that place ads on Facebook. The service includes post statistics and post reach, as well as demographics and locations of users.

DATA ANALYTICS



Privacy-Preserving Technologies

Privacy-Preserving Technologies

If processed data sources contain personal data (name, address, date of birth, etc.), these may require special protection. This can be achieved through the use of privacy-preserving technologies. For example Multi-Party Computation (MPC) is a very valuable cryptography technique. It enables multiple parties to perform joint data analysis. Thereby, the input data of each party is not revealed and only the result of data analysis is shared among the parties involved.

The goal of MPC is to perform data analytics using multiple data providers in a privacy-preserving manner.

Sharemind (from Cybernetica) is a privacy-preserving data analysis service. It uses multi-party computing to achieve compliance with the General Data Protection Regulation (GDPR) and similar laws. Private satellite-based collision prediction, private mobile positioning services and collaborative medical research are examples of applications created by Sharmined.

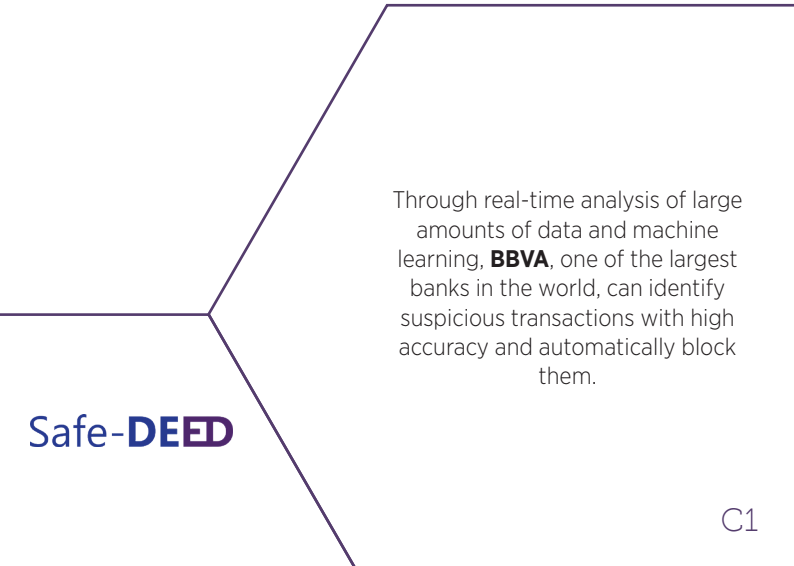


Automated Actions

Automated Actions

Results of a data analysis process may be used to inform or trigger automatic decisions which provide value for customers or users.

For example, the analysis of weather data (temperature, sun intensity, wind speed, rainfall) can be used for automatic decisions in home control, such as control of heating, air conditioning, window shading, etc.



Through real-time analysis of large amounts of data and machine learning, **BBVA**, one of the largest banks in the world, can identify suspicious transactions with high accuracy and automatically block them.

Safe-**DEED**



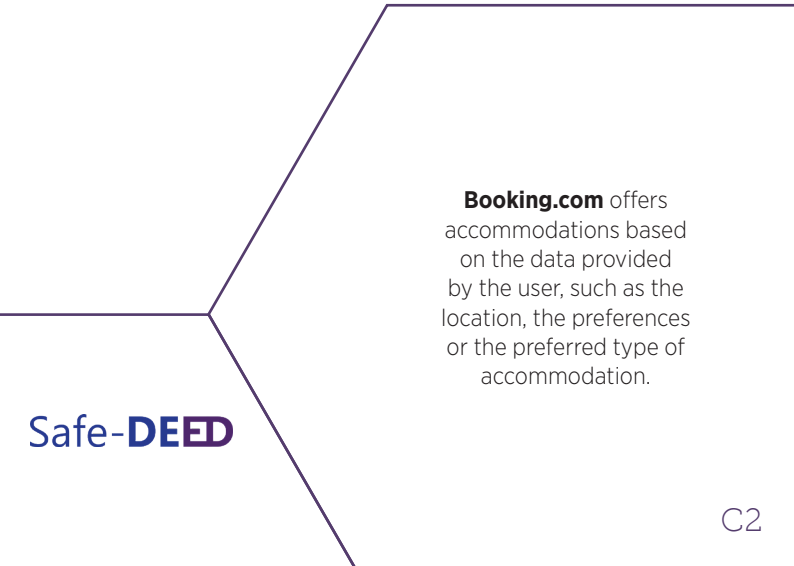
Image: istockphoto.com



Decision Support

Decision Support

The provision of data or findings from data analytics serve users as a basis or support for a decision. A well-known application area is medical diagnostics. Patient data records or x-rays can be analysed in order to support a doctor to prescribe the right medication.



Booking.com offers accommodations based on the data provided by the user, such as the location, the preferences or the preferred type of accommodation.

Safe-**DEED**

DATA SERVICES



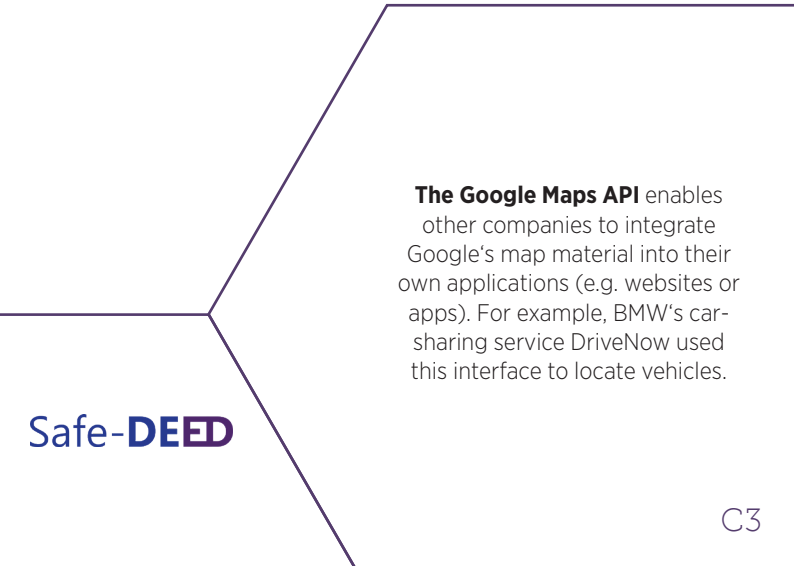
Image: istockphoto.com

A graphic consisting of several interconnected hexagons in a light purple color, located in the bottom left corner of the page.

Application Programming Interface

Application Programming Interface

An Application Programming Interface (API) is a software interface that can be accessed by other applications and enables the exchange of machine-readable data between programs, websites or data storage systems.



The Google Maps API enables other companies to integrate Google's map material into their own applications (e.g. websites or apps). For example, BMW's car-sharing service DriveNow used this interface to locate vehicles.

DATA SERVICES



Image: iStockphoto.com



Automated Report

Automated Report

A report is a static presentation of the results of a data analysis process in the form of tables or diagrams, often enriched with evaluations, recommendations for action or comments. In a data service, reports are automatically generated on the basis of the data and made available to the user, e.g. via e-mail.



Safe-DEED

The Austrian telecommunications company **A1** created „A1 Mobility Insights“ to provide standardised reports on movement patterns within a certain period of time based on anonymised cell phone location data. These reports answer industry-specific questions, for example where customers in a shopping center are coming from.

DATA SERVICES

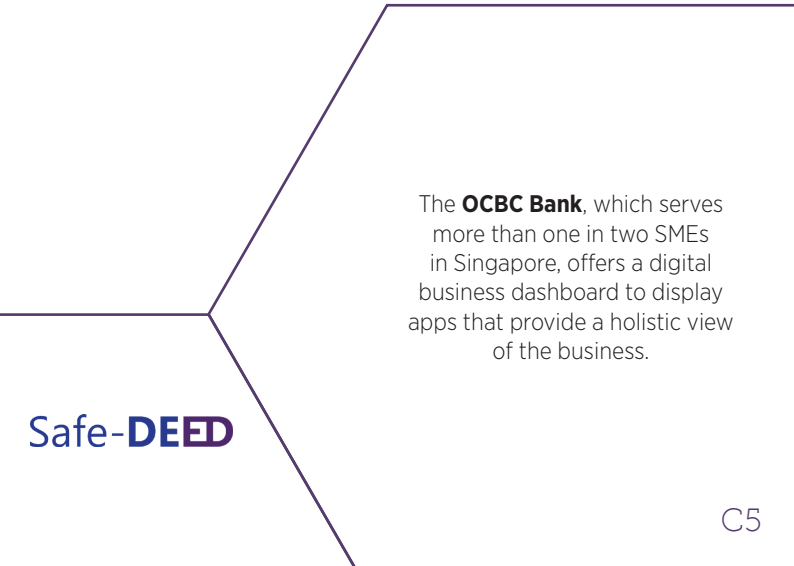


Image: istockphoto.com

Dashboard

Dashboard

A dashboard is a simple and clear visualization of relevant data and/or information, e.g. by combining several diagrams with key figures and statistics. A dashboard enables interactive data visualisation to track processes or to answer economic questions.



The **OCBC Bank**, which serves more than one in two SMEs in Singapore, offers a digital business dashboard to display apps that provide a holistic view of the business.

DATA SERVICES




Image: istockphoto.com

Web-Element & Software Function



Web-Element & Software Function

Data analysis results are integrated in the form of web elements or special functions or features of a software, e.g. suggestions for next steps or entries in a text field.



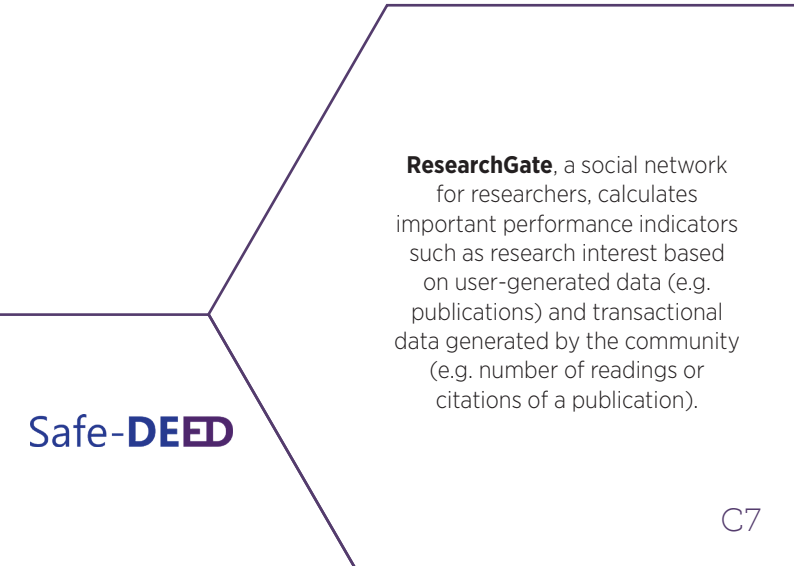
The mobile device operating system **Android** offers an integrated text suggestion and completion function, e.g. in the messaging app. The function suggests the next words when the user writes a message based on data from the previous messages.



Key Performance Indicator (KPI)

Key Performance Indicator (KPI)

A Key Performance Indicator (KPI) is a quantifiable key figure that enables organisations to measure the performance of a department or evaluate a system or a machine over time.



ResearchGate, a social network for researchers, calculates important performance indicators such as research interest based on user-generated data (e.g. publications) and transactional data generated by the community (e.g. number of readings or citations of a publication).

DATA SERVICES



Image: iStockphoto.com



Benchmark

Benchmark

A benchmark is the comparative analysis of results with a fixed reference value (e.g. a key performance indicator). This allows, for example, to compare a product to an alternative created by competitors based on technical or economic parameters.

AVL, the world's largest independent company for the development, simulation and testing of powertrain systems, offers as a service a benchmark of the world's most important car models based on 10 attributes (e.g. performance). To that end, 150 vehicles are comprehensively measured each year and individual criteria for the attributes are calculated based on the data. Companies can use these findings to compare their own models with the competition in order to derive development goals for future models.



Image: iStockphoto.com

Raw Data

Raw Data

Raw data can be provided as an external data service. Raw data can be very valuable for other companies since it can be aggregated with already existing data or may enable new data analysis and insights.



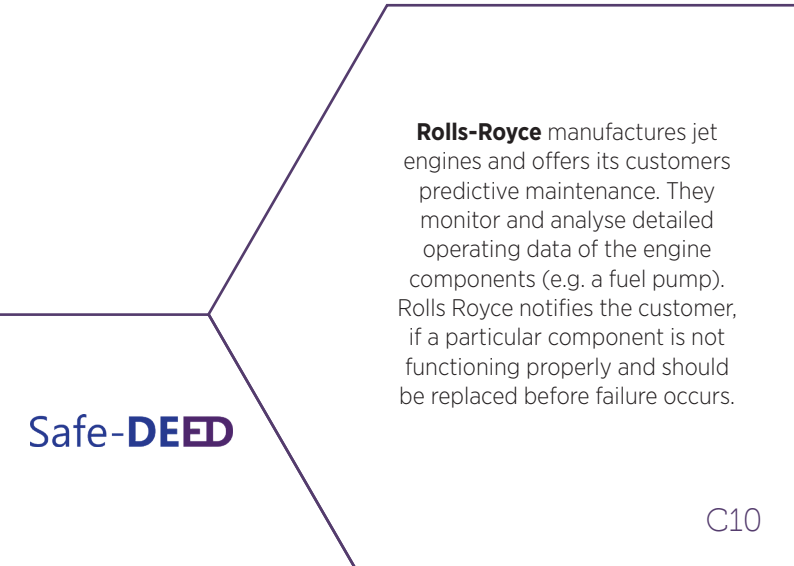
The Sentinel-1 project of **ESA (European Space Agency)** is a data service that provides companies, researchers and the general public with raw (radar) data from its satellites.



Notifications

Notifications

With the help of data analytics, deviating behaviour and events (such as outliers or anomalies) can be detected or predicted. Based on this, automated notifications or alarms for the user can be activated.



Rolls-Royce manufactures jet engines and offers its customers predictive maintenance. They monitor and analyse detailed operating data of the engine components (e.g. a fuel pump). Rolls Royce notifies the customer, if a particular component is not functioning properly and should be replaced before failure occurs.

BENEFITS



Information &
Knowledge Gain

Information & Knowledge Gain

Increasing the level of understanding through data analysis creates considerable benefits for a wide variety of targets, e.g. people, processes, products and services.



Invenium Data Insights

analyses aggregated motion sequences at regional and national events using anonymised cell phone data.

Based on this real-time information, important business decisions can be made, e.g. regarding customer security.

BENEFITS




Image: istockphoto.com

Proactivity



Proactivity

As opposed to a reactive action, proactivity means planning ahead and actively carrying out an action that is typically initiated by the addressee of the action. In many areas with varying degrees of routine, data can serve as a basis for deciding if something needs to be done before the actual deadline expires.



A German telecommunications company **Deutsche Telekom** proactively identifies service requests (e.g. repairs, maintenance) by monitoring social media and takes appropriate action before the customer acts.

BENEFITS




Image: istockphoto.com

Image Gain

Image Gain

The application of innovative data-driven technologies can make organisations, companies, products, services, brands, etc. more attractive to the stakeholders.



By analysing anonymised customer data, customer contact points of the **PSD bank Hannover** can be arranged experience- and fact-based, which leads to a stronger customer orientation at each customer contact point and to an improved image.

BENEFITS



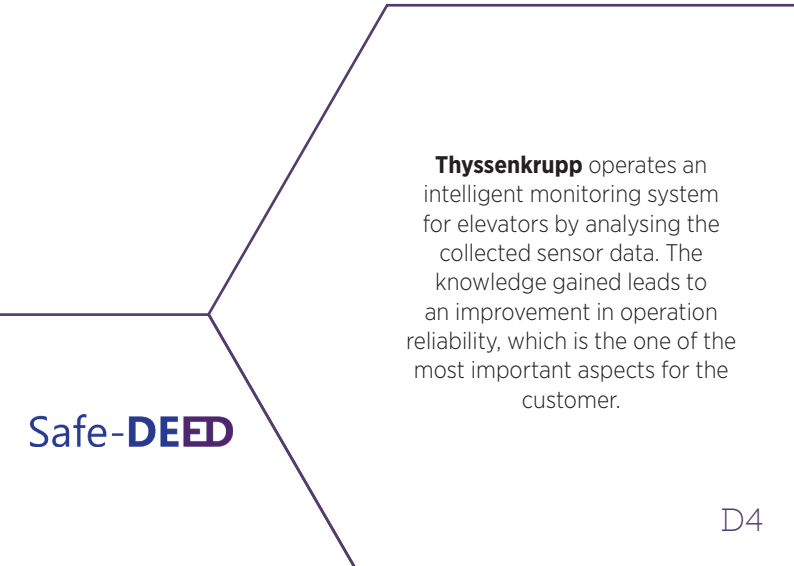
Image: istockphoto.com



Customer Satisfaction & Trust

Customer Satisfaction & Trust

The combination of customer and product data is an important piece of information for supporting and guiding decisions that will ensure or improve customer satisfaction.



Thyssenkrupp operates an intelligent monitoring system for elevators by analysing the collected sensor data. The knowledge gained leads to an improvement in operation reliability, which is the one of the most important aspects for the customer.

Safe-**DEED**

BENEFITS



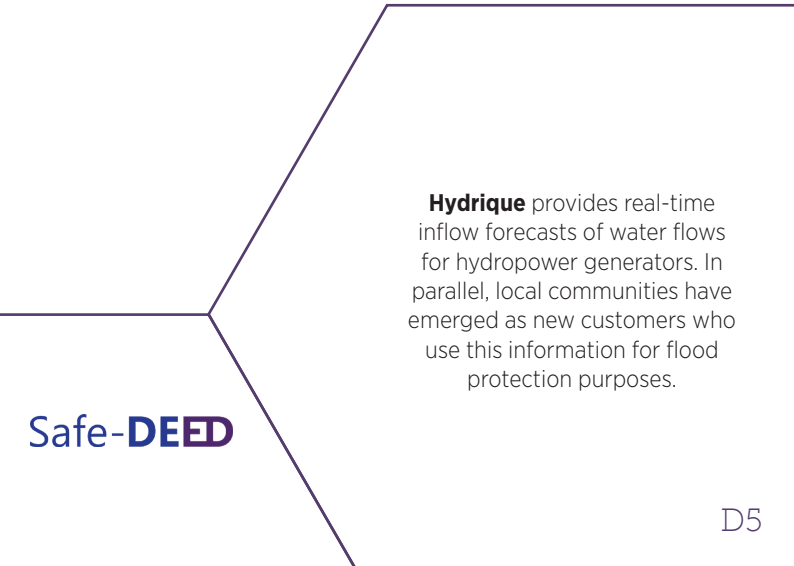
Image: istockphoto.com



Customer Acquisition

Customer Acquisition

Using data serves for a better understanding of how to acquire new customers systematically and efficiently. A graphical representation of analyzed customer and sales data can be used to illustrate which corporate strategies should be pursued. New customers can be acquired through targeted measures.



Hydrique provides real-time inflow forecasts of water flows for hydropower generators. In parallel, local communities have emerged as new customers who use this information for flood protection purposes.

Safe-**DEED**

BENEFITS



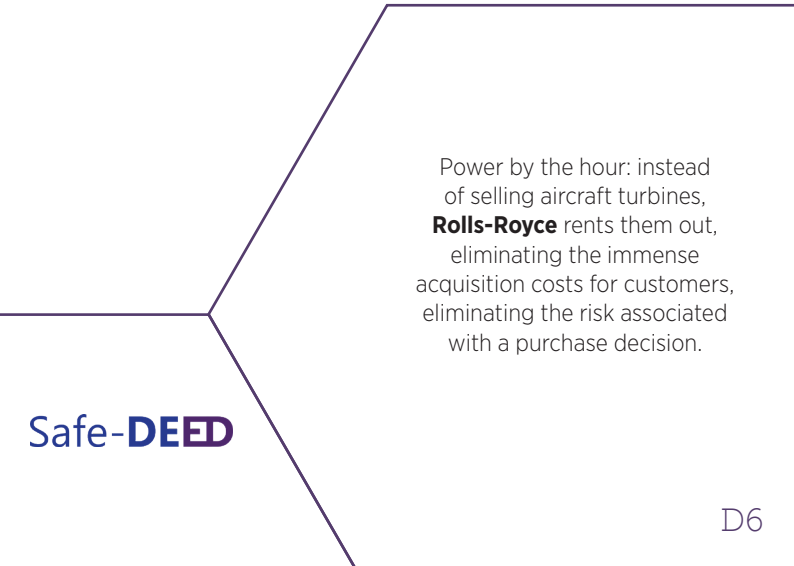
Image: istockphoto.com



Cost Optimisation

Cost Optimisation

Cost optimisation is a business-oriented, continuous activity. Data analyses can provide considerable support for simplifying and rationalising systems, applications, processes and services or for ensuring the best prices and conditions for all purchases and sales.



Power by the hour: instead of selling aircraft turbines, **Rolls-Royce** rents them out, eliminating the immense acquisition costs for customers, eliminating the risk associated with a purchase decision.

Safe-**DEED**

BENEFITS



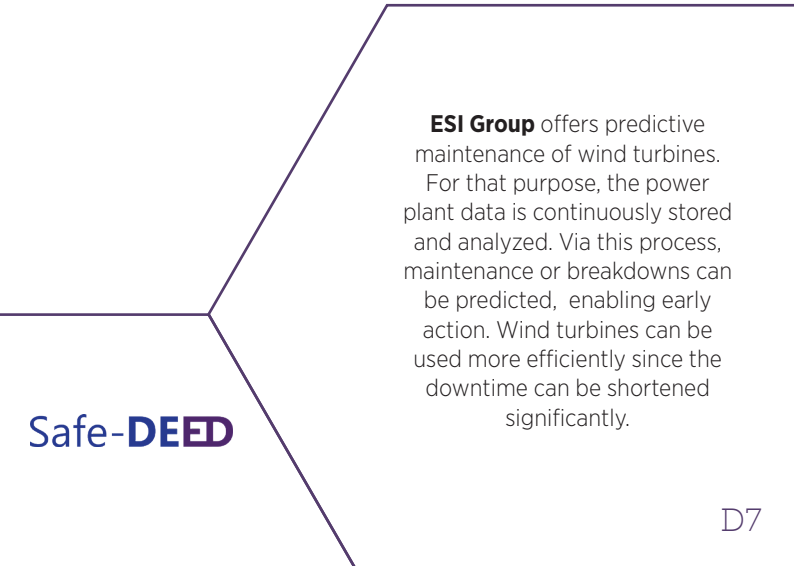
Image: istockphoto.com



Time Optimisation

Time Optimisation

Data-centric optimisation of the time factor: using data analysis (e.g. of process data), many forms of time savings can be realized at a customer or company level, e.g. through proactive action or reduction of throughput or reaction times.



ESI Group offers predictive maintenance of wind turbines. For that purpose, the power plant data is continuously stored and analyzed. Via this process, maintenance or breakdowns can be predicted, enabling early action. Wind turbines can be used more efficiently since the downtime can be shortened significantly.

BENEFITS



Image: iStockphoto.com



Quality Optimisation

Quality Optimisation

By evaluating quality-relevant data with the help of suitable analysis methods, the quality situation can be presented accurately. For example, error analyses can be used to clearly identify and weight errors in different areas. Based on this, more targeted measures can be derived to improve the quality of products or services.



Magna, an Austrian automotive supplier, achieves improvements in the paint coating through a correlation analysis of parameters and targeted control of those parameters that actually influence the quality most.

BENEFITS

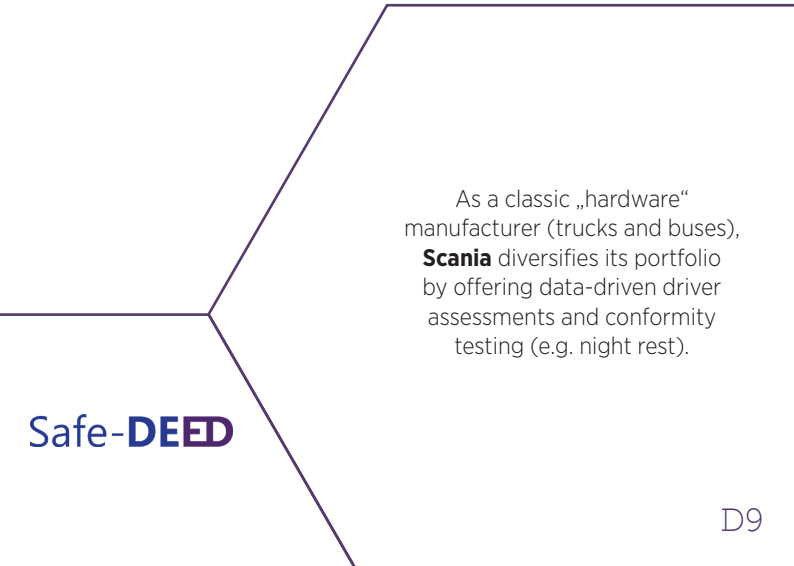


New Revenue Streams



New Revenue Streams

In addition to securing the established revenue streams, data services enable diversification, creating new business opportunities by using data in new and innovative ways.



As a classic „hardware“ manufacturer (trucks and buses), **Scania** diversifies its portfolio by offering data-driven driver assessments and conformity testing (e.g. night rest).

Safe-**DEED**

BENEFITS



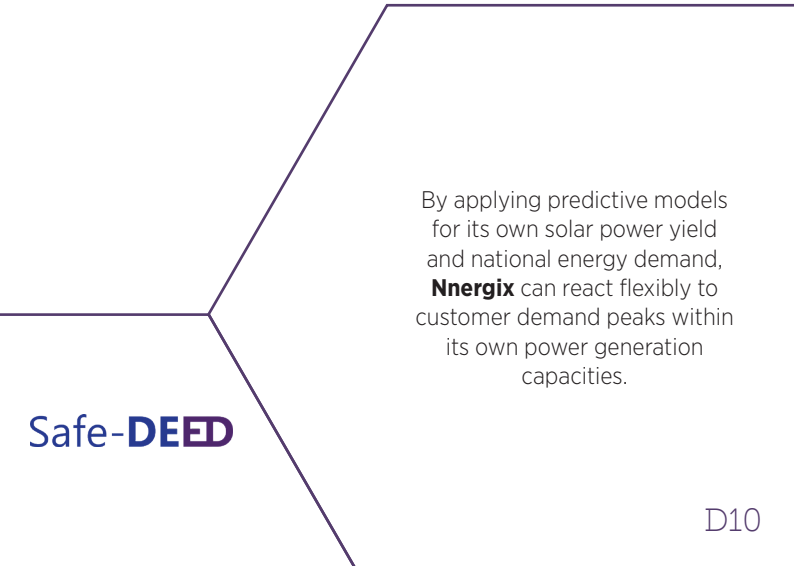
Image: istockphoto.com

**Flexibilisation &
Dynamisation**



Flexibilisation & Dynamisation

The world is changing ever faster, together with the expectations of customers. Data services enable companies to adapt to new or changing conditions as quickly and efficiently as possible.



By applying predictive models for its own solar power yield and national energy demand, **Nnergix** can react flexibly to customer demand peaks within its own power generation capacities.

REVENUE MODELS

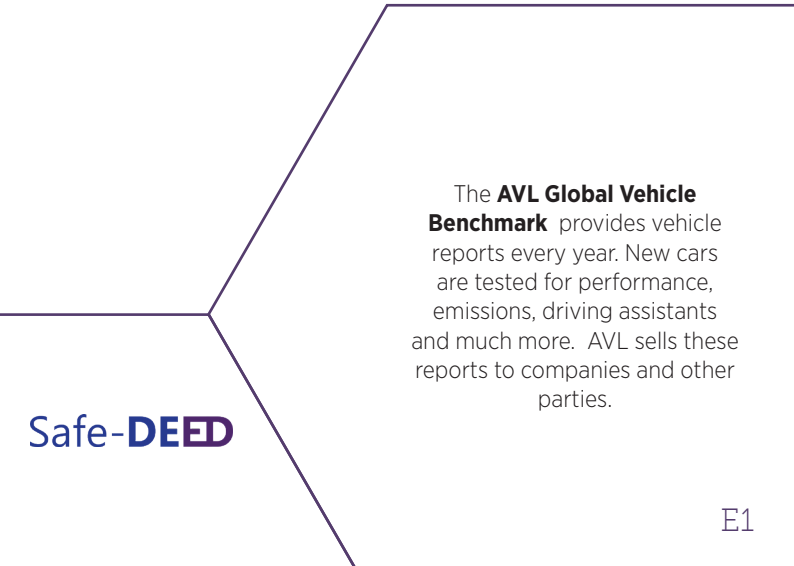


Image: istockphoto.com

Data Sale

Data Sale

With this revenue model the client has the possibility to purchase various (unique) products of a website. Popular goods are datasets, these can be bought in a raw or in a prepared format.



The **AVL Global Vehicle Benchmark** provides vehicle reports every year. New cars are tested for performance, emissions, driving assistants and much more. AVL sells these reports to companies and other parties.

Safe-**DEED**

REVENUE MODELS



Image: istockphoto.com

Data Service Sale

Data Service Sale

This revenue model includes the sale of data related services.

For example, data analyses, machine learning algorithms, or individualized data analysis reports based on customer-provided data can be sold. The price is determined according to the effort involved.



Alexander Thamm GmbH is a German company specialised in data analysis and artificial intelligence. It helps companies to optimise their company structure by using data analysis and artificial intelligence. Furthermore, they offer various services, but also trainings and workshops in the field of data science.

Subscribe

Shift

Image: istockphoto.com



Subscription

Subscription

The subscription revenue model generates revenue by making customers pay regular fees, e.g. monthly or annually, for temporary access to data products or services. The user commits to a contract with a recurring payment but benefits from a mostly unlimited use of the data services and products.



The application **Readly** offers more than 3400 print magazines in a digital version. With a monthly subscription, one get access to all available magazines. Readly employs recommendation systems fed by user generated data to direct clients to magazines that fit their tastes



Pay-per-Use

Pay-per-Use

This is a use-dependent pricing model in which the customer pays a fee based on the intensity of use. However, the customers do not acquire ownership rights to the products, they only pay for their use. Even though the underlying model suggests maximum potential client flexibility, providers strive for a high degree of customer satisfaction to ensure a stable and lasting contractual relationship.

The machine manufacturer **J.G. WEISSER SÖHNE GmbH & Co** relies on this revenue model.

They provide machines and charge a rent based on the time of use. Thus, the production process can be optimized and a transparent cost calculation for the production can be created.

Furthermore, it is intended to maintain the liquidity of companies in case of production shortage.

REVENUE MODELS



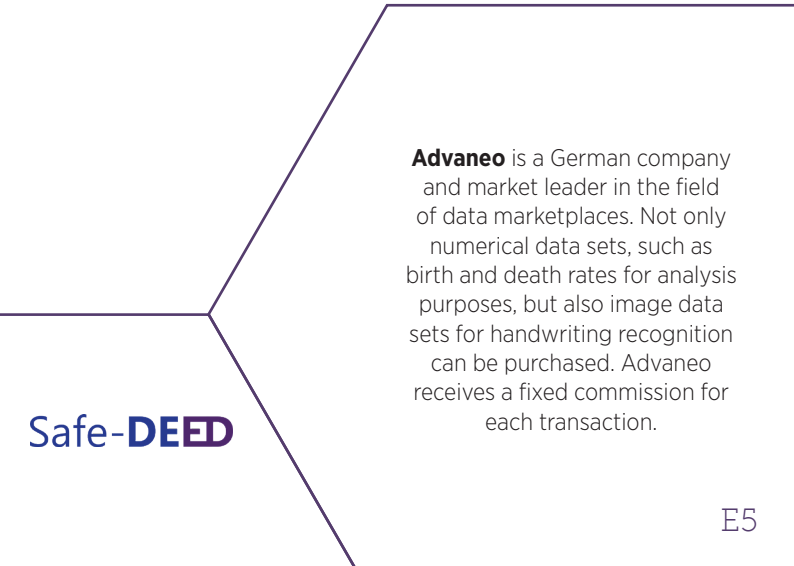
Image: istockphoto.com



Commission

Commission

Within this revenue model, e.g. an internet platform provider receives a commission fee for every matchmaking between buyer and supplier of data products and services, such as data sets or machine learning algorithms.



Advaneo is a German company and market leader in the field of data marketplaces. Not only numerical data sets, such as birth and death rates for analysis purposes, but also image data sets for handwriting recognition can be purchased. Advaneo receives a fixed commission for each transaction.

Safe-**DEED**

REVENUE MODELS



Image: istockphoto.com

Freemium



Freemium

Customers can use the basic version of a data service with limited functionality for free. To use the full extent of the service or product, the customer has to pay for an upgrade. For example, a Freemium model can be used to attract new customers.



Safe-DEED

MyFitnessPal is a diet application that helps to count calories. By scanning the barcode of the respective product the user gets information regarding included calories, but also corresponding macronutrients. This service is offered free of charge, additional functions and analysis tools are only available in the premium version, which needs to be paid for.

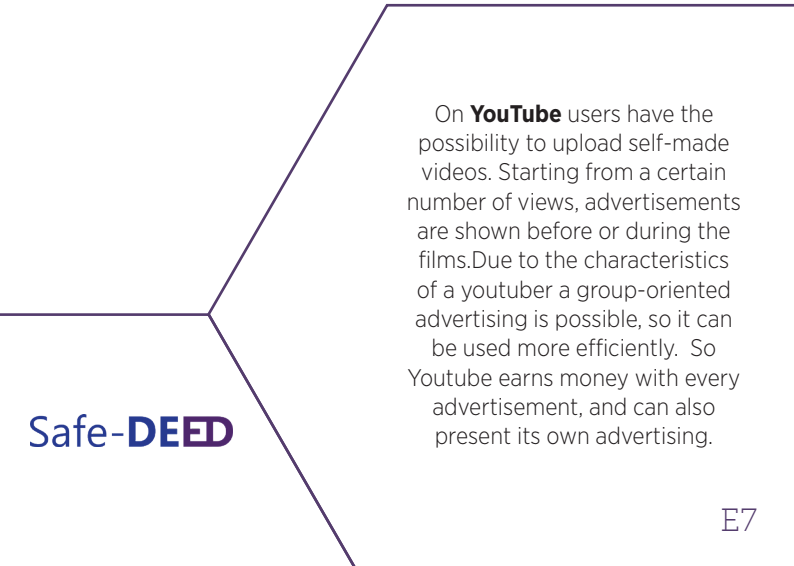
REVENUE MODELS



Advertisement

Advertisement

If an advertising-based revenue model is in place, users can access services apparently free of charge. However, users have to endure advertisements, paid by a third-party, for the free usage of the service. The service provider gets paid by the third party. In addition, data analysis can be used to optimise advertising revenue by targeting users with appropriate interests.



On **YouTube** users have the possibility to upload self-made videos. Starting from a certain number of views, advertisements are shown before or during the films. Due to the characteristics of a youtuber a group-oriented advertising is possible, so it can be used more efficiently. So Youtube earns money with every advertisement, and can also present its own advertising.

REVENUE MODELS



Paying with Data

Paying with Data

The use of apps or websites generates large amounts of data. As a by-product of the actual service use these are generated unconsciously. The service can be made available without monetary compensation because the users pay indirectly for the product or service with their data.

In addition to its sports watches, **Garmin Connect** also offers a tracking app for activities.

This allows you to record your workouts and display performance data. In addition to user-related data, users' individual running or cycling routes are also recorded.

Garmin uses this data for further analysis and therefore offers the app for free.

REVENUE MODELS



Crowdsourcing

Crowdsourcing

Crowdsourcing refers to the outsourcing of traditional internal subtasks to a group of voluntary users, e.g. via the Internet. The data services that benefit from crowdsourcing are often provided free of charge to generate user growth. By using them, customers jointly and actively generate service-related data, such as feedback, which can be used to optimise (other) data products & services.

Duolingo is a free learning platform that teaches you languages in a playful way. During the course segments, individual phrases have to be translated again and again. Which translations are correct will be determined on the basis of the most frequently given ones as well as individual user feedback and expert opinions. In this way Duolingo succeeds in finding a suitable and meaningful translation for almost every possible phrase. This language knowledge can then be sold in the form of translation services to news services or website operators. E9



Indirect Monetizing

Indirect Monetizing

Benefit of data services and products does not always have to be monetary. For instance, a free data-driven service in addition to established products can yield many advantages: From raising awareness, attracting new customers, to creating a new differentiation factor that makes a company stand out from the crowd.

With **Citi Bike** you can explore cities with rented bicycles. You can buy single, monthly or annual tickets and locate the bikes via an app. In addition, Citi Bike offers another service through which the company collects data about the buyer, such as routes, start and end times, gender and much more, each time the bike is used. This data set is freely available to everyone. It can be used for data analysis and provides a lot of information about the usage behavior of bikeriders.