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## MINDS | IDEAS

These women and men are digitizing Germany.

### RESEARCHERS, PROMOTERS, NETWORKERS

**TEACHABLE MACHINES.** **Professor Wolfgang Wahlster** directs the German Research Center for Artificial Intelligence (DFKI), the world's largest such facility in the field. One focus in artificial intelligence is on "deep learning" in production. Deep learning uses multi-layered neural networks to enable automated learning processes. It can help collaborative robots, for example, use example data to quickly learn the new tasks they need to perform on joint human-robot teams.



**THE STREAMLINER.** A consultant with the Berlin-based UseTree agency, **Ariane Jäger** develops user-friendly devices and software. Jäger and her colleagues are supporting the EOS 3D-printer manufacturer in redesigning the machines' operational controls. The touchscreen menu is now more intuitive and makes use of familiar icons like toothed gears and wrenches. Multiple operating levels accommodate different levels of user knowledge and needs.



**THE ANALYST.** As Chief Information Officer and Chief Process Officer at SAP, **Ingrid-Helen Arnold** played a major role in digitization at the corporation. A native of Germany, she moved to Silicon Valley in 2016 as president of the SAP Business Data Network. She and small teams analyze and process clients' big data to derive new knowledge from existing information, solve concrete business problems, and develop innovative business models.



**THE IDEA GENERATOR.** **Professor Johann Füller** knows that success can make people happy, but can also give them tunnel vision. A native of Munich who teaches at the University of Innsbruck's School of Management, he founded the HYVE innovation company in 2000. It has brought new energy to two-thirds of German companies on the DAX. HYVE works with its clients to find gaps in product portfolios previously assumed to be exhaustive. This has produced innovations like a virtual reality fitness machine that makes users feel like they're flying.



**THE PROFESSOR.** **Professor Gesche Joost** advises the European Commission on behalf of the German government about the "Digital Single Market" project, which seeks to make the European Common Market fit for the digital age. A native of Kiel and a professor of design at the Berlin University of the Arts, she and her students at the Design Research Lab study innovative ideas like the Smart Maintenance Jacket, which helps wearers find their way through buildings and warns them of potential hazards. Joost is also a member of the SAP Supervisory Board.



**FOCUS ON THE FUTURE.** **Verena Pausder** is the founder and CEO of Fox & Sheep, a company that develops apps for preschool children and markets them worldwide. Together with the Haba toy maker, she launched a workshop where kids 5 to 14 years of age can discover the digital world in playful ways. They can experiment with 3D printing, programming, and robot building. Herself a mother of two, Pausder serves as a mentor for the non-profit "Startup Teens" initiative, which helps young people develop entrepreneurial ideas and projects.



**SECURITY.** **Professor Claudia Eckert** directs the Fraunhofer Institute for Applied and Integrated Security (AISEC) and holds the chair of IT Security at the Technical University of Munich. She is a member of the Bavarian Academy of Sciences and the executive board of Acatech, the German National Academy of Science and Engineering. She advises several German federal ministries as well as industrial corporations and international public organizations on cybersecurity.



**DATA PROTECTION.** **Constanze Kurz** is the spokesperson for the Chaos Computer Club, Europe's largest association of hackers. She contributes to the German-language blog *netzpolitik.org*, and writes a column for the *Frankfurter Allgemeine Zeitung*. She focuses on the Internet, society, and policy, on IT security, and on monopolies. And she advises the German Federal Constitutional Court in cases involving issues such as voting machines or data retention.



**START-UP TRAILBLAZER.** Berlin as the European Silicon Valley—this is the vision of real estate entrepreneur **Udo Schloemer**. He is the founder of Factory Berlin, Germany's first and largest start-up campus, for which he converted a historical brewery site into office space. Both start-ups and established companies can rent individual work stations or rooms here and use them as co-working space. The idea is to enable corporations and medium-sized companies to network with start-ups and collaborate on innovative ideas.



**AVANTE-GARDE HOUSING.** **Lars Hinrichs**, founder of the Xing business network, wants to revolutionize homes. He converted a 1908 residential building in Hamburg into a super-smart home. Known as the "Apartimentum," its 20 apartments are equipped with cutting-edge technology controlled by 14 apps on residents' smartphones. The underground garage has one of the largest electric car-charging facilities in Germany. Basic rent for the apartments is 3,000 to 6,500 euros, depending on size.



**GOOD CAUSE.** Berlin native **Till Behnke** is the founder of the Betterplace donation platform. Users can provide money, goods, time, or knowledge for good causes. Those who want to start an aid project but don't have funding yet can apply to Betterplace and receive donations. The *nebenan.de* platform is another of Behnke's projects. It enables neighbors with shared interests and mutually complementary skills to find and support one another.



**THE VISUALIZER.** Visualizations by data designer **Stephan Thiel** enable large amounts of data to be presented in transparent ways—visually or physically. The data take forms ranging from application-optimized graphics to experimental installations and sculptures. Thiel founded the Nand design studio in Berlin. One of its projects is the Los Angeles Energy Atlas, an interactive website that visualizes the largest set of disaggregated energy data in the state of California.



**MOBILITY MEETS MANUFACTURING.** **Dr. Ralf Hofmann**, partner and managing director of the MHP management and IT consultancy, founded in 1996, heads one of the leading consulting firms in the automotive, mobility, and manufacturing sectors. This Porsche subsidiary digitizes processes throughout the entire value chain for its customers. Nearly 2,000 employees at 13 sites support more than 300 companies worldwide—and increasingly in cooperation with Porsche Consulting.



**SENTIENT ROBOTS.** **Professor Sami Haddadin** directs the Institute of Automatic Control (IRT) at Leibniz Universität Hannover, where he works on intelligent and sentient robots. They can distinguish between different surfaces and therefore precisely adjust the power they need for different tasks. Another of his projects consists of developing highly sophisticated upper limb prostheses. Their prehensile strength is situation-dependent, which enables the wearer to perform a greater range of activities.



**THE INVESTOR.** **Frank Thelen** started founding and directing technology and design-based companies in 1994. A native of Bonn and CEO of the e42 venture capital company, he invests in start-ups such as the young Lilium aviation company in southern Germany. Lilium is developing the world's first electric jet. Thelen urges companies not to wait until a new project permanently transforms their sector, but instead to take a pro-active approach to finding their own solutions.



### ONLINE ENTREPRENEURS

**MUSIC STREAMING.** **Hans-Holger Albrecht** is CEO of the Deezer streaming service. Subscribers can access 43 million titles at any place or time. Founded in Paris in 2007, the company offers an innovative flow function that adapts music selections to users' tastes. Deezer has more than ten million active users in more than 180 countries.



**THE NETWORKER.** **Stephanie Czerny** founded the digital conference known as Digital Life Design (DLD) for the Burda publishing house in 2005. As CEO of DLD Media GmbH, she also holds worldwide spin-offs of this innovation forum in places like New York and Tel Aviv. A native of Munich, she is superbly connected in Silicon Valley and can recruit top-level speakers like Facebook founder Marc Zuckerberg and Alphabet executive chairman Eric Schmidt for these events.



**INNOVATION PILOT.** Lufthansa Innovation Hub was founded in Berlin in 2014. It develops ideas to make flying easier, and tests digital business models using its own prototypes. **Sebastian Herzog** and the other members of its management board scout for travel technology start-ups that can work together with Lufthansa. One of the Hub's own products is Service AirlineChecks.com, which automatically checks in travelers for flights with more than 100 airlines.



**FOCUS ON CUSTOMERS.** As Chief Digital Officer of the Allianz Group of insurance companies, **Solmaz Altin** is in charge of everything from redesigning customer interaction to investing in start-ups and developing new business models. More than 120 employees from 30 Allianz companies worldwide work together at the group's Global Digital Factory. They develop new strategies that focus on the customer's point of view. Solutions have to be simple, transparent, and available to customers worldwide at any time.



**THE DIGITAL ACCELERATOR.** **Oliver Tuszik** is the chairman of the management board for Cisco in Germany. The IT company wants to invest 500 million dollars in Germany over three years to accelerate digitization—by means of seed capital as well as research and training projects. Cisco's openBerlin innovation center in the capital city seeks to support medium-sized companies in developing solutions for digital business models with the help of selected start-ups and partners.



**INNOVATIVE EDUCATION.** Former Stanford professor **Sebastian Thrun** wants to democratize higher education with the help of the Udacity online academy. It offers courses primarily in programming and information technology. Some of the content is developed jointly with tech companies like Google or Facebook, with the aim of training graduates in targeted ways for industry jobs.



## ONLINE ENTREPRENEURS

**AUTOMATIC AUTHOR.** Founded by Stuttgart entrepreneur **Saim Alkan**, AX Semantics provides software that writes texts. The content comes from structured data sets, and the algorithm first learns what form and tone the text should take. The more data available, the easier it is for the software to create texts. The algorithm from AX Semantics generates up to 90 million texts a day for weather forecasts, sports news, and online product descriptions.



**DIGITAL INVESTMENT CONSULTANT.** Many banks now use robo advisors to determine the right strategies and make automatic investment decisions for their clients. Founded in Frankfurt by **Ralf R. Heim** and his partners Friedhelm A. Schmitt and Stefan Post, the Fincite start-up offers digital asset management. The Fincite Core platform can analyze, monitor, and optimize existing portfolios. Banks can integrate the algorithm-based software into their services.



**THE DECORATOR.** Online shops for clothing and accessories abound, but **Delia Fischer** wanted one for furniture and decorative items. She quit her job as a fashion journalist for the women's magazine *Elle* and founded the Westwing shopping club in 2011. It provides registered members with new interior decoration offers every day. It is active in ten countries, with more than 7.9 million registered users worldwide.



**THE PLAYER.** Hamburg native **Hendrik Klindworth** is one of three founders of InnoGames, a leading developer and producer of online games. The InnoGames portfolio currently consists of six games that can be played on computers or smartphones. Users only pay if they wish to acquire additional functions. The company's sales rose by 25 percent to 130 million euros in 2016. Its 400 employees come from more than 30 different countries, with more than 150 million players registered worldwide.



**THE GLASSES GUY.** **Dirk Graber** is a co-founder of Mister Spex, an online shop with more than 3,000 brand-name frames on offer. Users can try them on digitally with photos or videos. The shop also works together with 550 local opticians in Germany, Austria, Switzerland, and the Netherlands, which test customers' eyes free of charge and send the results to Mister Spex. Customers then receive their glasses by mail.



**DIGITAL MEDICAL RECORDS.** Physicians often have to spend a lot of time and effort to gather health information about patients referred to them. So **Dr. Johannes Jacubeit**, a surgeon, and his partner Matthias Lau developed the LifeTime app plus the associated LifeHub hardware. Patients install the app on their smartphones, and doctors access their data via the LifeHub device, which is about the size of a deck of cards. Transmission and storage of these confidential data are strictly local. Around 200 physicians in Hamburg are already using LifeTime. The app has been downloaded nearly 10,000 times.



**SCIENCE WITHOUT BORDERS.** As a researcher at Massachusetts General Hospital in Boston, **Dr. Ijad Madisch** looked in vain for an expert who could help him solve a specific problem. That led to the idea behind ResearchGate, an online platform he founded with two friends in 2008. Since then, it has connected 12 million scientists from 193 countries and provided access to around 100 million articles.



**CULTURAL KNOWLEDGE.** **Professor Holger Simon** and his colleague Professor Stephan Hoppe founded the Pausanio agency, which develops software for websites, apps, and audiovisual media specifically for cultural institutions. The aim is to provide knowledge in clear and interactive forms to the broad and diverse target groups for museums, galleries, and concert halls. The "Schlösserland" ("land of castles") app developed for the German state of Saxony, for example, takes users on tours of historical parks, with special audio stations that provide details about their origins and design.



**MATH ONLINE.** With Bettermarks, his digital learning platform, **Arndt Kwiatkowski** seeks to revolutionize the way people learn and teach mathematics. Students can use the program on their own to solve problems and do exercises. The software adjusts its level to individual learning needs and skills. This is a targeted way to close gaps in mathematical knowledge. Kwiatkowski, who also founded the ImmobilienScout24 real estate platform, would like to see Bettermarks replace math books.



**SECOND-HAND LUXURY.** Rebelle, an online shop created by **Cécile Wickmann**, sells high-grade vintage women's fashion. Each item is checked by an expert team for quality and authenticity. Rebelle receives a commission based on the amount paid for the items.



**READ FIRST, THEN PAY.** Digital payment models are a challenge for publishing houses. Users are accustomed to accessing parts of the products on their websites free of charge. **Cosmin Ene** wants to change this with a start-up that enables micropayments. "LaterPay" lets publishing houses sell digital content for profit starting with payments of five cents. Users only have to register and pay when they have read articles from different websites adding up to a value of five euros.



**THE ORGANIZER.** Co-founded by industrial engineer **Philip Magoulas**, Shore provides software that enables companies to run business processes simply and efficiently online. Small and medium-sized companies can offer online appointment services, or manage vacation and sick leave digitally. Shore's software has more than 40,000 subscribers. The Munich-based company's sales have tripled every year since it was founded in 2012.



**GAME RECOGNITION.** The Arena app co-founded by **Dr. Hubertus Porschen** offers innovative marketing in the form of individually adaptable game-based apps. Clients can incorporate them into their corporate design, websites, and social media presence. In the form of memory games, sweepstakes, or Advent calendars, the apps familiarize users with the respective companies, brands, and products. The aim is to create lasting memories. The basic technology has already been used to create more than 3,000 client-specific apps.



**THE PIONEER.** **Ralph Dommermuth** is the founder and CEO of United Internet AG. The company offers Internet access and application products such as the GMX and Web.de e-mail services. Formerly known as "1&1 Marketing," in 1988 it was the first Internet company on the Frankfurt Stock Exchange. With more than 16 million paying customers and over 33 million ad-financed free accounts, United Internet AG is currently the largest Internet service provider in Europe.



**FLYING INSPECTORS.** Instead of sending technicians to check rooftop photovoltaic systems, Ucair's quick and simple alternative is to use drones with cameras. This saves considerable time and costs for customers, and facilitates prompt maintenance and repair. Ucair arose from the Innogy energy company's "Free Electrons" innovation hub. **Thomas Birr**, Senior Vice President for Innovation & Business Transformation at Innogy, directs the hub.



**THE SHOEMAKER.** **Gerd Manz**, Vice President Technology Innovation on the Adidas Future team, directs the "Speedfactory" project. It seeks to reduce the shoe creation process to a few days. This summer a factory in the Bavarian town of Ansbach will start high-volume production using additive processes to build shoes layer by layer. Over the medium term this Speedfactory is expected to produce 500,000 pairs of sports shoes a year.



**DIGITAL PENMANSHIP.** **Oliver Göbller**, CEO of the German subsidiary of the Montblanc manufacturer of writing instruments, has found a way to link analogue writing with the digital world. Augmented Paper consists of a notebook and the specially developed StarWalker pen. Notes made on the paper can be transmitted to mobile devices by the "Montblanc Hub" app and Bluetooth technology. The app also allows handwritten notes to be edited, shared, and converted to digital text.



**INCUBATOR.** **Christian P. Illek**, the member of the Deutsche Telekom board of management in charge of human resources, founded the Digital & Innovation division in 2016. It uses innovative working methods to promote the digital transformation of the Bonn-based corporation. Its team serves as an incubator to develop new ways of working together in the digital age. Among other things, it produces the company's internal online magazine *Working in the Digital Age*. Employees can use this platform to engage in intense, critical discussion on topics in this field.



**SMART RAILS.** **Dr. Eberhard Kurz**, Chief Information Officer at Deutsche Bahn, is using digital early warning systems to reduce delays. Three thousand railroad switches have already been equipped with sensors in order to provide automatic repair notifications. Other projects include digitizing the company's sales structure and creating a big-data center of excellence that encompasses all of the company's divisions. Deutsche Bahn will invest around one billion euros in digitization projects by 2018.



## INDUSTRY DIGITIZERS

**FASTER PROTOTYPES.** Founded and directed by **Dr. Hans J. Langer**, EOS is the leader on the world market for industrial 3D printing. Headquartered in the town of Krailing near Munich, the company provides powder-based additive manufacturing solutions to customers in industry and aviation & aerospace. These technologies produce components layer by layer from molten metal and plastic materials, thereby shortening prototype construction and development times.



**PRINTED TURBINES.** The gas turbine at a power station in the Czech city of Brno is a pilot project from Siemens. Three of its twenty-four gas turbine burners have heads made by 3D printing. The 3D printing process can produce burner heads about 40 percent faster than conventional methods. The project comes from the additive manufacturing department led by **Dr. Sebastian Piegert** at Siemens' Power & Gas division.



**DIGITAL PORSCHE.** For 20 years, **Thilo Koslowski** headed the automotive division at the Gartner technology and consulting firm in Silicon Valley. In mid-2016 the expert in digitization and new business models returned to Germany in order to found Porsche Digital GmbH. The Porsche subsidiary designs strategies and solutions for digitization, connectivity, and smart mobility. In Koslowski's view, a Porsche is the ultimate and most exciting mobile device of all.



**NEW VIEW OF ELEVATORS.** A digitization project launched by **Andreas Schierenbeck** makes elevator maintenance more efficient. The CEO of Thyssenkrupp Elevator AG, he promoted the use of HoloLens technology from Microsoft. Mixed-reality headsets let technicians see the specific data of the elevators to be serviced before they arrive at the site. During the actual procedures the headsets can show all additional technical data and also enable long-distance expert consultations via live imaging. This system can make elevator service up to four times faster.



**LEARNING FROM NATURE.** Festo's Bionic Learning Network takes nature as its model for new technologies and solutions in digital production. A recent development by the team led by **Dr. Elias Knubben** is a pneumatic lightweight robot that mimics the human arm with a seven-axis kinetic system. Humans use opposing sets of muscles to grip objects. This principle has been incorporated into the seven joints of the BionicCobot, which enables it to perform actions with different levels of intensity.



**INTELLIGENT GRIP SYSTEMS.** Schunk, a family-owned and operated company based in the town of Lauffen on the Neckar River, wants to make full use of the potential offered by human-robot collaboration. The Schunk Co-act JLI gripper is the world's first intelligent gripping module equipped with a sensor-based aura that lets it interact and communicate directly with people. **Henrik A. Schunk** is one of the company's executive partners.



**NEW SENSOR SYSTEMS.** The Würzburg-based Indact start-up founded in 2013 by **Clemens Launer** and Dr. Raino Petricevic makes tiny, highly sensitive sensors for industrial components. They react with extreme sensitivity to vibrations or minute material changes like expansion, yet are very robust themselves. They are embedded in airplanes, wind turbines, and other systems, for example, where they can monitor wear and trigger an alarm as needed.



**HEADSETS.** **Wolfgang Stelzle** creates digital worlds. He is the founder of Re'flect, one of the leading European agencies for augmented reality (AR) and virtual reality (VR). A native of Munich, he and his team produce innovative products for industry and marketing. He believes AR and VR will play key roles in industry in the future, and predicts that within ten years, production sites will give their technicians the information they need on headsets rather than screens.



**SHOPPING REVISITED.** The MediaMarktSaturn retail group is running a pilot project for its MediaMarkt and Saturn stores in Ingolstadt: it is testing drive-by counters where customers can pick up their online orders. Chief Digital Officer **Martin Wild** wants electronic price tags to secure prices and provide access to additional information and video clips. And at the Ingolstadt Saturn store, a robot from the development lab of the Fraunhofer Institute for Manufacturing Engineering and Automation (IPA) has been on the job since November 2016, guiding customers to the products they are looking for.



**BEYOND CAMERAS.** First as a freelancer, then as a managing director, **Armin Pohl** turned Stuttgart-based Mackevision into one of the leaders on the world market for computer-generated images. The company is especially well known for its automotive imagery. It also provides moving images, such as visual effects for the *Game of Thrones* fantasy series.

