



Technology & Data @Bertelsmann

13 stories about Data, the Cloud, and Artificial Intelligence

What's Your Story?
Volume 8

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A Tailor-Made Tech Agenda



Thomas Rabe
Chairman and Chief Executive Officer
of Bertelsmann

→ Bertelsmann's goal is to become a technologically leading media, services, and education company. Using new technologies to further develop existing businesses and to build new ones are priorities for us.

To achieve this, we have adopted a package of measures at both the Group and business level. We have formulated a tech agenda that focuses on three key technological areas: data, the Cloud, and artificial intelligence. The newly established Bertelsmann Technology and Data Advisory Board is responsible for mainstreaming the tech agenda and putting it into action. In an interview in the following pages, Rolf Hellermann, head of the Advisory Board, explains how it is tackling this task.

At the same time, Bertelsmann wants to get people excited about new technologies. And so, with the Udacity Technology Scholarship Program we are awarding 50,000 technology scholarships to help empower people to be successful in the digital world – especially our own employees. Concurrently, our Bertelsmann digital campaign is encouraging policymakers and society to adopt a positive attitude towards digitalization with all its exciting changes, great opportunities, and new possibilities. You can learn more about the scholarship program and the campaign in this book as well.

As in every volume of our “What’s Your Story?” series, in this eighth edition, several of our entrepreneurs tell their story. This time, they report on how they employ new technologies in their workaday routine to advance their businesses. The possibilities they are exploring are as diverse as Bertelsmann itself; the spectrum ranges from the development of new TV advertising technologies and pricing for e-books to the development of data-driven services for the energy sector.

I wish you happy reading as you peruse these and all the other stories in “Technology & Data @ Bertelsmann!”

Thomas Rabe

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“Digitalization offers exciting change – and we want to be the ones to actively shape it.”

Thomas Rabe, Chairman & CEO of Bertelsmann

Bertelsmann stands for creativity and entrepreneurship. We shape digital change and drive innovations – and by doing so we are making an important contribution to Europe’s digital future.

Which is why we are giving away nearly 50,000 tech scholarships to Udacity’s online learning platform. This is your chance – don’t miss out! #50000chances

bertelsmann.com/50000chances

BERTELSMANN

Bertelsmann campaigned for digital change throughout Europe with full-page advertisements in newspapers and magazines.

Bertelsmann Intends to Shape the Digital Transformation

Bertelsmann is advocating for people – both within and outside the company – to advance their own tech skills and embrace digitalization as an opportunity. The Group most recently and impressively underscored its commitment with two international initiatives: the Udacity Technology Scholarship Program, and the Bertelsmann digital campaign. They both launched in September 2019, and complement each other.

→ In the Udacity Technology Scholarship Program, Bertelsmann is bestowing 50,000 scholarships for courses at the online university, in which they are a key strategic shareholder. The program runs for three years and focuses on the key areas of the Cloud, data and artificial intelligence. Applications for the first 15,000 scholarships were accepted from September to November 2019. The response was tremendous: Bertelsmann University received more than 45,000 applications. Applicants who won a scholarship are already hard at work studying with Udacity to develop their digital skills. The scholarships are aimed both at beginners – although basic computer skills are recommended – and at experienced programmers. Bertelsmann will award another 15,000 scholarships to each this year and next. The top ten percent of gradu-



“Bertelsmann is actively and aggressively campaigning for a successful digital future for Europe”

Karin Schlautmann

Karin Schlautmann, Head of Corporate Communications, Bertelsmann SE & Co. KGaA

ates of the annual Challenge Courses each receive a follow-on scholarship for a full-fledged Udacity Nanodegree in the fields of cloud computing, data, and artificial intelligence – this year, for degrees such as Cloud DevOps Engineer, Data Analyst or Deep Learning. In total, the scholarships are valued at several million euros. This makes the program unprecedented at Bertelsmann in terms of its size, duration and scope.

Thomas Rabe declared: “Bertelsmann intends to become the world’s technologically leading media, services and education company. We are especially looking into opportunities in the areas of data, the Cloud, and artificial intelligence. We feel it is our responsibility to empower as many people as possible to be successful in the digital world.”

Chief HR Officer Immanuel Hermreck made it clear right at the start of the scholarship program that this is especially applicable for Bertelsmann’s own employees: “The continued training of our employees has been and will be essential for Bertelsmann. We see it as our responsibility to prepare our employees as best as possible for the demanding digital and technical tasks of tomorrow’s world of work.” He said the high level of interest confirms that tech skills are regarded as necessary not only by the company, but also from the employees’ point of view.

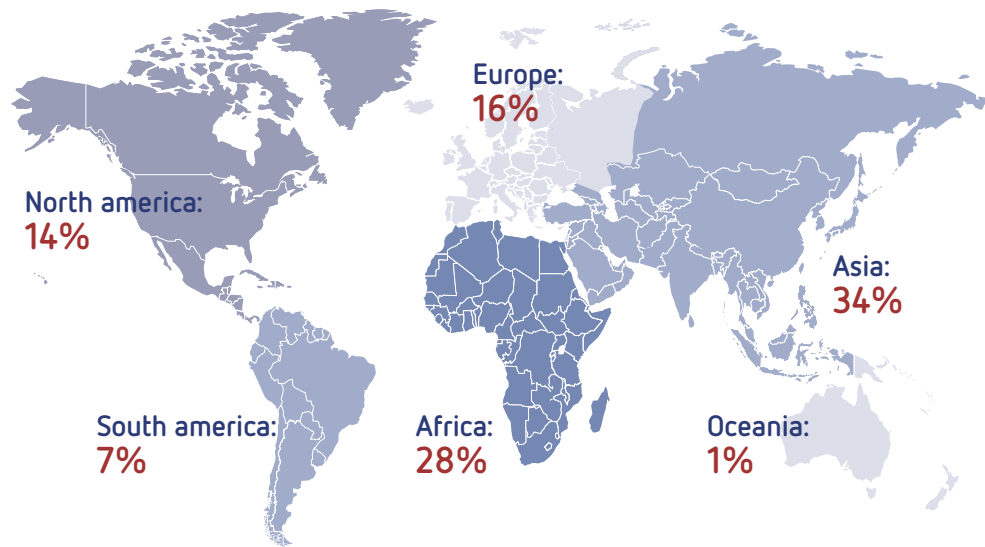
Preparing for the working world of the future

Three weeks after starting the scholarship program, Bertelsmann followed up by launching an extensive image campaign, run by Bertelsmann Corporate Communications, under Karin Schlautmann’s leadership. Said Schlautmann: “While the scholarship program is specifically designed to enable people to be successful in the digital world through continuing education, the image campaign also highlights the importance of digital education for society as a whole. As the campaign’s originator, Bertelsmann is actively and aggressively campaigning for a successful digital future for Europe beyond a business framework. The campaign is aimed at decision-makers in politics, society, and business.”

The ads in which Thomas Rabe promotes digital change ran internationally in major daily newspapers, as well as in selected local and regional newspapers, and in the G+J magazines “Stern,” “Capital,” and “Business Punk” in September. The two TV commercials, in which Thomas Rabe is featured alongside Udacity founder Sebastian Thrun, or startup entrepreneur and Udacity graduate Laura Weil, were shown on various Mediengruppe RTL Deutschland channels – and, of course, can now be seen in-house on BENET. In addition, there were banners in the online campaign, and a dedicated landing page with the



Alongside Thomas Rabe, Udacity founder Sebastian Thrun, and start-up entrepreneur and Udacity alumna Laura Weil were featured in two videos.



The greatest number of applications for the Udacity Technology Scholarship Program came from Asian countries.

URL www.bertelsmann.com/50000chances. The commercials were developed in-house by the G+J subsidiary Territory, together with Bertelsmann Corporate Communications. They are fast-cut, alternate between color and black-and-white, and reflect a high degree of internationality.

The campaign also very deliberately communicated messages about Bertelsmann as well. Comments Karin Schlautmann: “Bertelsmann itself is digital through and through. Our Group already generates half of its revenues digitally. We have well embarked on the path to becoming a leading user of new technologies in the areas of media, services, and education with our Group-wide tech agenda. With the digital campaign, we are also formulating our aspiration to shape the digital transformation and advance innovation. In this way, we make an important contribution to Europe’s digital future, and assume social responsibility.” ■

→ www.bertelsmann.com/tech-and-data



“The continued training of our employees is essential”

Immanuel Hermreck



Chief HR Officer Immanuel Hermreck (above) and Chief Learning Officer Steven Moran



Rolf Hellermann, CEO of Arvato Financial Solutions and leader of the newly-founded Bertelsmann Technology and Data Advisory Board.

“Leverage the Latest Technologies for Our Businesses”

Rolf Hellermann isn't just the CEO of Arvato Financial Solutions. The top manager has also headed the Bertelsmann Technology and Data Advisory Board since it was set up in the summer of 2019. In our interview, Mr. Hellermann talks about the Board, the Bertelsmann tech agenda, and how things stand with Bertelsmann and tech in general.

→ Mr. Hellermann, Thomas Rabe wants to make Bertelsmann “a leading user of new technologies in the areas of media, services, and education.” What does this mean exactly?

Rolf Hellermann: The emphasis is clearly on “user.” Bertelsmann doesn't intend to become a tech corporation itself, but rather to leverage new technologies for its businesses. And it wants to do so on three different levels: First, by increasing the efficiency and productivity of our existing businesses with the help of new technologies. Second, we want to use new technologies to open up additional revenue potential. And third, we'd like to develop new technologies from existing businesses based on new technologies.

How far have we come on the path to achieving this?

We're in the process of preparing the ground and making sure the prerequisites are in place. Bertelsmann's move to the Cloud is a milestone because it creates the necessary infrastructure. I'm referring to the systematic shifting of applications and business processes to the Cloud. Under the lead management of Bertelsmann CIO Matthias Moeller, all of our businesses have developed individual plans for migration to the Cloud, and some are already implementing them.

Besides such specific steps, what else has to change at Bertelsmann to ensure a successful tech transformation?

Bertelsmann needs even more transparency and exchange. This may be true for many areas within the Group, but it is absolutely essential in the fields of tech and data. By more exchange I mean, on the one hand, the cultivation of personal networks and sharing of expertise, and on the other, the specific exchange and sharing of technological solution modules. Tools, algorithms, applications, and software developed at one Bertelsmann company shouldn't have to be reinvented at another, but should instead be available to all. We are currently in the process of building the right instrument for just an organized exchange: the Bertelsmann Collaboration Platform. There are already specific examples of this idea being implemented.

Could you cite some of these examples?

RTL Group, for example, announced in September that Mediengruppe RTL Deutschland will head a newly created European development unit in the advertising technology sector, while France's Groupe M6 will develop the technological platform for RTL Group's streaming services. Instead of replicating the same work at two or more locations in the Group, modules are being developed in one place that can also be accessed by others in other businesses and countries. The fact that smaller units operate independently at Bertelsmann is only an advantage here. They just need to network better, and create interfaces where others can dock.

And how much will employees themselves have to change?

First of all, we need to create a broad-based, fundamental understanding of new technologies among management and employees alike. This will be about welcoming new technologies as an opportunity, embracing them, and using them. To awaken the potential of Bertelsmann's employees at the next stage, we need to build or expand their tech skills. The Bertelsmann and Udac-

ity scholarship program points the way here. The same goes for the Median program, which is designed to attract new tech experts from outside the Group to Bertelsmann.

Does this mean that today's Bertelsmann employees are too dismissive of new technologies?

No, not at all. I don't see any resistance to or skepticism about new technologies at Bertelsmann, even if colleagues certainly regard them – and rightly so – as a challenge. The crux of the matter is that many at Bertelsmann didn't grow up with these technologies, but now have to use, evaluate, or communicate them. Younger employees find this easier. For some, all this is self-evident, others have to learn it. But the willingness is there. And so are the necessary offerings, such as the scholarship program I mentioned earlier, and other courses offered by Bertelsmann University. Beyond this, we can increasingly learn directly from each other. We've created the first platforms for this practical exchange with the Data Exchange Community, which already has more than 400 members.

... and with the Technology and Data Advisory Board, a top-level committee that you chair. What is the role of the board?

The Technology and Data Advisory Board's core task is to anchor the tech agenda. It sets the tone for Bertelsmann's strategy regarding tech and data, while at the same time ensuring what I've just mentioned: transparency and exchange, the pooling of expertise, joint solving of challenges, and initiation of overarching projects. Our goal is to promote a tech-friendly and forward-looking environment at Bertelsmann. There are a number of events and initiatives to this end. They range from creating the appropriate technological infrastructure to setting up networks for experts, to training and recruiting, and organizing hackathons. Whether in plenary sessions or in individual working groups – the board wants to promote collaboration on tech-related matters. We have two forms of collaboration in mind: One is collaboration between people across their respective departments. And the other collaboration between Bertelsmann's divisions.

Who sits on the Board?

The Technology and Data Advisory Board currently has 16 members from nearly every division and several countries. We had two things in mind in choosing them: for one, we wanted to bring together the people responsible for the various topics on the tech agenda and, for another, proven tech ex-



The Technology and Data Advisory Board.

Top row, from left: Niels Pothmann (Arvato Systems), Carlo Szelinsky (G+J), Matthias Moeller (Arvato Systems), Katrin Gaertner (Bertelsmann), Thomas Duhr (RTL Group), Martin Weitzel (Arvato Systems), Martin Boronski (RTL Group), Carsten Coesfeld (Arvato Supply Chain Solutions) and Steven Moran (Bertelsmann).

Bottom row, from left: Nihar Malaviya (Penguin Random House), Deniz Pielsticker (Bertelsmann), Sebastian Hentzschel (BMG), Mino Zarbafi (Bertelsmann), Valery G rfaud (RTL Group), Peter Lipp (Bertelsmann Printing Group), Rolf Hellermann (Arvato Financial Solutions), Dorothee Heuwerth (Bertelsmann), Rhys N lke (Bertelsmann) and Carsten M nning (Bertelsmann)

perts from our businesses. The composition of the board alone already creates more transparency about who at Bertelsmann has what tasks and what ideas when it comes to technology.

Even before the Technology and Data Advisory Board was founded, you initiated the Technology Heatmap for Bertelsmann. What exactly is that?

It’s not as mysterious as it sounds. We systematically defined, across the entire Group, which new technologies are the most relevant – the “hottest” – for which businesses. Irrespective of the technological trends that may additionally have a strong impact on individual businesses, we wanted to filter out the megatrends that really affect everyone and everything at Bertelsmann. The result was clear: data, the Cloud, and artificial intelligence or machine learning are the three major areas of particular importance to Bertelsmann.

Why these three? And how do they relate to each other?

For me, the Cloud is the enabler, artificial intelligence is a key technology, and data is the fuel to power them. The Cloud is about setting up and operating an IT infrastructure that is optimal for Bertelsmann, one that facilitates the aforementioned smooth exchange of modules, and enables our IT to concentrate on entirely different, much more creative and complex tasks than constantly setting up and operating server infrastructures. Artificial intelligence is a technology that is already being used in many areas of the Group and can make processes much simpler and more reliable. At Arvato Financial Solutions, for example, AI recognizes what a customer’s communication is about. It automatically assigns the request to the relevant department – or solves the problem itself. The Content departments also use artificial intelligence to identify images, texts, or videos. But AI can only ever work, and here we come to the third aspect, when the data it compares and works with is available in large quantities and is of good quality. That’s why I like to describe data as the fuel for new technologies.

Though the tech giants like Google or Facebook are clearly ahead, especially with regard to data volumes ...

That’s right. Even if tech giants like those you mention, or Amazon too, are by far Bertelsmann’s biggest and most important customers at many levels, here they are our toughest competitors. Thanks to the immense data sets, they know everything about their fans, followers, or customers – from their preferences to their shopping habits. Accordingly, they can deliver online ads tailored for each individual consumer. We all know that when we browse the

internet. This is a major challenge for Bertelsmann, which we can only master if we consolidate our – likewise valuable – wealth of data. The Ad Alliance and log-in alliances such as Net ID are a first step in this direction. It's undeniable that the pressure building up from the outside has significantly increased Bertelsmann's willingness to work together internally. That is a new development – and it's a good thing.

Technological development also puts pressure on employees. In many places there are fears that technology, especially artificial intelligence, could displace people and threaten their jobs. Is that the case?

Artificial intelligence is already better and faster than humans at performing certain tasks, especially repetitive ones. This may lead to changes in the world of work in these areas. But I don't see it as a mass phenomenon. On the contrary, where artificial intelligence takes over such processes, people are given room for more complex and exciting activities. Besides, artificial intelligence always requires human intelligence to manage and feed it. It will not – at Bertelsmann as elsewhere – make people superfluous. ■

→ www.bertelsmann.com/tech-and-data



Matthias Moeller, CIO of Bertelsmann

“We Want to Create Value”

The Bertelsmann Collaboration Platform, which was unveiled by Bertelsmann CIO Matthias Moeller at the Management Meeting in Gütersloh in May 2019, aims to promote exchange and cooperation on IT issues across company and country boundaries. Now it is important that as many companies as possible participate in the collaboration now, contribute their own solutions, and use the existing applications, as he emphasizes in an interview.

→ Actually, it's a very simple concept: Let's say a Bertelsmann company is developing a new IT application that it needs for its business – but would also like to make it available to other Group companies if required. Or another company urgently needs an IT solution, but does not have the capacity to develop it itself – and is therefore looking for an existing technology. How does the first company know which others might be interested in IT applications? And how does the second company know which tools, algorithms, applications, or software programs exist in the Group and where it could get them from? The Bertelsmann Collaboration Platform (BCP), which Bertelsmann CIO Matthias Moeller presented at the Management Meeting in Gütersloh in May, represents a Group-wide solution to this problem. In the meantime, Corporate IT, in cooperation with Arvato Systems, has implemented a Group-wide platform operation. Several interesting IT applications are already available for download, explains Moeller in an interview. For the platform to become properly established, it is important that as many companies as possible participate in the collaboration now, contribute their own solutions, and use the existing applications, he emphasizes.



The Group Management Committee has discussed the Bertelsmann Collaboration Platform as well



The platform also supports companies that want to do business with large volumes of data



The path to the Cloud is a focus topic in the Bertelsmann Technology Heatmap



The Bertelsmann Collaboration Platform already contains applications relating to Artificial Intelligence

Mr. Moeller, why is the Bertelsmann Collaboration Platform so important for the Group?

Matthias Moeller: It supports companies in the technologization and digitalization of their businesses, relying on the entire Group's know-how and expertise. In accordance with the focus topics of the Cloud, data, and artificial intelligence defined in the Bertelsmann Technology Heatmap, we are using this central platform, which is open to everyone, to create the prerequisites for the necessary technological change across all divisions. It serves as an “enabler” for the Bertelsmann Tech Agenda, so to speak. Knowledge transfer, sharing ideas, and offering specific solutions – the Bertelsmann Collaboration Platform aims to combine all of this and make it available throughout the entire Group.

Who is the platform aimed at and what specifically does it offer companies?

The platform is aimed at all tech developers at all Bertelsmann companies, as well as anyone who is interested in innovations and is open to an exchange on the topic. In terms of content, it is firstly about improved collaboration and a more intensive exchange of ideas in the area of IT. At our companies, we have so many colleagues with exactly this kind of extensive expertise, the kind that is urgently needed in other places as well. Why shouldn't we be able to share and use this expertise? However, this requires a Group-wide exchange and communication channel, which we are opening with the Bertelsmann Collaboration Platform. Secondly, we want to set up a kind of virtual showroom to highlight existing business scenarios already in the Group that can serve as a point of reference or model for others. If you are interested, the relevant information can then be exchanged directly. Thirdly, a central collection point for IT solutions and software packages that have already been developed is the heart of the platform. Such existing assets can be used via technical interfaces, where data can be entered, evaluated elsewhere, or edited, and then sent back. Or a software source code is available that can be downloaded and used directly for your own purposes. Bertelsmann has never had either of these in this form or to this extent.

What applications are already available on the platform?

There are already some exciting applications. For example, an IT solution designed by Arvato Systems, Gruner + Jahr, and the Corporate Legal department that uses artificial intelligence to review draft contracts is available. It checks them to see whether they are compatible with the relevant legal standards and specifications, and if there is a need for further revision. This solution can

even be used on smartphones. The AI is still in training. It's getting smarter and smarter, so that the application will be available at full capacity in the near future.

Can you give us another example?

The Arvato Systems subsidiary Vidispine offers cloud-based technology for the broadcast and media industry that makes it possible to analyze video content. The video asset management system can quickly search videos for known persons, e.g., or recognize unwanted sequences, such as content that glorifies violence. This will greatly free up all those colleagues involved with the video material. This IT solution is already available on the Collaboration Platform for all interested parties. The partners then have to agree the terms of use among themselves.

What's the next step? How do you plan to rollout the Bertelsmann Collaboration Platform?

Now we have to breathe life into it, use it everywhere, and above all add even more content to it so that it is accepted throughout the Group happily, many other applications are already in the pipeline. We need to network and create value together. To achieve this, we will use all available channels to address the IT community at Bertelsmann. We mustn't forget that our key competitors have been using similar platforms for a long time. To leverage our potential here, Bertelsmann also has to make the comprehensive use of our collective IT resources a matter of course. Bertelsmann's Executive Board took a clear position on the Tech and Data Agenda at the Management Meeting in May, and the Group Management Committee also expressly supports the activities. And this summer, the Bertelsmann Tech and Data Advisory Board, headed by Rolf Hellermann, began work on developing initiatives and measures to implement the Bertelsmann Tech & Data Agenda – which the Bertelsmann Collaboration Platform increasingly and fully supports. All this puts heavy demands on the platform team, but is also a great motivator. So, we are very happy that it's been so well received by our contacts in the divisions. A later step, incidentally, could be to open elements of the Collaboration Platform and its contents to the outside and expand the possibilities of collaboration with other interested partners. This would also enable us to tap further business potential. ■

→ www.bertelsmann.com/tech-and-data



Thomas Servatius, Chief Technology Officer of Smartclip

Smart Advertising with Ad-Tech

Using the right advertising clips to precisely target potential customers on internet-enabled televisions or on smartphones, tablets, and computers is an art that not many IT specialists have mastered as thoroughly as Smartclip, RTL Group's ad-tech provider. The company's IT solutions, which are based on big data and increasingly on artificial intelligence, are winning more and more customers in Europe – even outside the Group, reports Thomas Servatius, Chief Technology Officer (CTO) at Smartclip. And the company aims to keep it that way: It is currently being developed into an open platform for European TV channels and streaming services.

→ In many countries, the global tech behemoths from the U.S. – Google, Amazon, and Facebook – have taken over advertising market shares that had long been held by national and regional marketers. However, the latter are now playing to their strengths in their respective markets: precisely targeting the desired demographics in high-quality environments – for example, in TV programs or on curated, editorially designed websites. The Ad Alliance with its partners IP Deutschland, G+J EMS, Smartclip, and Spiegel Media, as well as Media Impact from the media companies Axel Springer and Funke, is one example of a marketing model that works well in the German advertising market. Smartclip contributes the technology that serves commercials on the right internet-enabled televisions, smartphones, tablets or computers at the right time. A business that has developed rapidly in recent years, as Thomas

Servatius, CTO at Smartclip, explains in the interview. The company is a tech pioneer and a European market leader in ad tech – and is now in the process of rapidly expanding its position.

“The times when we all just gazed at Google and co. in awe are long gone,” says Servatius. “At Smartclip, for example, we have the more sophisticated technology that is better suited to the complex European market. And we have exceedingly experienced employees who help us to get more and more program providers and website operators in Europe excited about our solutions.” The Product team, which has offices in Gütersloh, Hamburg, and Berlin, only has around 40 staff at the moment – including the software developers who support them from all over. A fraction of what their competitors in Silicon Valley can offer, in other words. And yet, the latter are increasingly losing out to Smartclip in Germany and Europe. Servatius explains why: “The U.S. market is vast and very homogeneous. So an IT service provider can launch a particular solution and offer it virtually nationwide – we call this ‘scaling’. This lets the company earn good money quickly. But Europe is a very different story – which is why

„The times when we all just gazed at Google and co. in awe are long gone“

Thomas Servatius

our solution is a completely different one.” When it launched in 2008, says the IT expert, Smartclip had already accounted for different solutions for eight different countries in the architecture of its products. “Because there are different laws and regulations in every country, and we flexibly designed our systems for them from the outset. Complexity is part of the Smartclip DNA, so to speak,” explains Servatius. So when multinationals start showing an interest in promoting their products and services across borders, Smartclip can bring its many years of tech experience into play, while other competitors will have a harder time given the complexity of the European market. “Besides, we don’t just serve advertising, but also have solutions for media planning and the efficient billing and payout of advertising revenues. Our customers get a complete, turnkey solution, as it were, but one that is also very flexible,” says Servatius.

The fact that Smartclip has focused on the few big European broadcasters as partners also plays into Smartclip’s hands. “We never catered to a mass clientele. This enabled us to quickly respond to our customers’ needs and develop new solutions,” says Servatius. Smartclip relies on a future-proof program

architecture as well as lean structures and processes. “Many of our team have been with us for a long time. They are focused on their work and know their business very well.” In addition, many processes are highly automated – importing new software versions, testing or launching applications only takes a few minutes these days and therefore hardly interferes with other processes. “We invest a lot of time and money in the continued optimization of our processes, which are, after all, used to book ads with a total value of millions and millions of euros a year,” says Servatius, explaining the business philosophy.

Automated decision-making processes

And these processes are in a class of their own. At the time of booking, an advertising customer or its agent can already determine many of the details of how the video advertising is to be played out. This includes the targeted demographic, the media and formats used, as well as many other factors such as the increasingly important monitoring of the advertising environment from the advertiser’s point of view. In particular, Smartclip combines conventional direct advertising campaigns with what is known as programmatic advertising. “In the past, it was sufficient to play out an advertising video at a certain place on a website to get as many hits as possible. That was the yardstick for success, but it didn’t take into account the returns ultimately achieved, because the number of views alone by no means indicates actual buying responses,” explains Servatius. He says this is why Smartclip became one of the first ad tech providers in the video sector to introduce auction-based ‘sales’ of advertising space as early as 2012. Here, in fractions of a second, the technology platforms of supplier and customer autonomously ‘bid’ for the price and availability of an advertising space, e.g. on a website. A great deal of data flows into this automated decision-making process, ultimately ensuring that the ad is used as efficiently as possible – i.e. reaches a given target group cost-effectively and precisely. In addition, Smartclip combines both booking forms – direct campaigns and programmatic advertising – to achieve the optimum result for the advertiser. “We were already ahead of our time back in the day. And we’ve since further refined our system – with success, as can be seen from the increase in our customers’ ad bookings,” says Servatius proudly.

Smartclip is also a tech trailblazer in the targeted ployout of commercials and their monetization on linear television (“addressable TV”). Unlike videos that can be viewed on demand, i.e. at any time, and can be interrupted by the provider for advertising as needed, targeted advertising during a live stream or a TV program running simultaneously on millions of TV sets is a particular challenge. “Our technology is able to detect a suitable position in a television



This is what the screen looks like when targeted advertising is superimposed onto a program.

channel's program line-up – for example a preview of another TV program – and digitally superimpose an advertising spot on it,” explains Servatius. This is also much more complex than the set-top box method that is used extensively, especially in the U.S., which prebuffers the video data of a clip, stores it, and plays it back on the connected TV set in response to a signal. In the technically much more complex process used by Smartclip, the commercial is also broadcast live – but only to group of viewers that has been pre-defined as precisely as possible, with nearly every single TV set having to be selected for a given campaign. This happens automatically, with the technology in the background making sure, e.g., that commercials are not served too often or only in a certain program environment. The prerequisite is that, like all new televisions, they meet the Hybrid Broadcast Broadband TV (HbbTV) standard and are connected to the internet. In Germany alone, this is the case in around 17 million households. But Smartclip is already working on an even more far-reaching solution: “We are already testing a technology with TV channels that can specifically serve certain commercials, even during a regular commercial break,” announces Servatius.

Advertising on live television is always a special – or, as Thomas Servatius puts it, “not uncomplex” – challenge for an ad tech provider. “At peak times, we deliver our advertising clips to as many as 1.5 million devices simultaneously. This puts great demands on our servers,” he says with a view to the mass of data involved. To cope with this volume,

“Our technology is able to detect a suitable position in a television program”

Thomas Servatius

new servers are quickly added into the system as needed – this process, too, is automated. All the servers used by Smartclip don't belong to the company itself, but are a cloud solution provided by an external service provider. “In terms of data volume, we're probably one of the biggest cloud users in the Bertelsmann Group,” estimates Servatius. The use of cloud technology also follows the Smartclip philosophy of sticking to one's core competencies. “We don't want to use our resources to run our own data center,” says Servatius. “This is not a success-critical skill for us, so we prefer to outsource it.” But Smartclip wouldn't be Smartclip if its IT experts weren't doing everything they could to optimize the benefits and keep costs as low as possible. “Over the past three years, we've doubled our data load while keeping the cost of cloud usage constant. This is mainly because we keep making better use of

our resources through constantly optimized process management, which gives us an additional competitive edge,” reports Servatius. At the same time, however, he says the company is careful not to commit to a single supplier and is able to switch to another at any time. “All processes are designed to work in any cloud environment,” says Servatius.

But what data is collected? What information does Smartclip’s technology evaluate? “In principle, we are able to record the use of approximately 30 million television sets connected to the internet, as well as PCs and mobile terminals, of course,” explains the Smartclip manager. “So for example, we can find out how often people watch the news or ‘Das perfekte Dinner’ on which devices.” The emphasis here is on “devices” – which doesn’t mean “people.” “Data protection is extremely important to us,” emphasizes Servatius. “We cannot draw any conclusions about the people behind the devices, nor do we want to. We have specially designed our systems to irreversibly and reliably delete the link between the internet connection’s IP address and the device identification number – and external experts have verified this as part of our certification in accordance with the new European data-protection regulations.” This is one of the reasons why the cloud-based solution can so readily be used

on rented servers without Smartclip having to worry about data theft: while the data is a valuable resource for Smartclip, it no longer has any sort of personal reference. “We don’t have to lose any sleep over this,” says Servatius dryly. He therefore takes a critical view of the need to further tighten data protection legislation to restrict the collection of data. “Big data was practically invented for online advertising,” affirms the Smartclip expert. “Further restrictions would massively hamper this innovation driver in the digital economy and ultimately endanger ad-financed businesses on the internet. Smartclip would continue to work – although at a different level,” he says, underlining the impact.

Because large volumes of data are the basis of Smartclip’s business. According to Servatius, the amount and quality of data has steadily increased in recent years. “In particular, there is not only more data, but it is also becoming broader and broader.” The Smartclip manager explains what he means by this: “In the past, five or six data dimensions might have been collected for

“We’re probably one of the biggest cloud users in the Bertelsmann Group”

Thomas Servatius

an advertising clip – such as the type of browser used to view the video, the number of page views, the number of actual clicks on the advertising banner, and so on.” In programmatic advertising, the prices that were asked and offered, and the buyer, were added. “By now, more and more dimensions can be evaluated. At Smartclip alone, there are currently over 70 that are provided in standard reporting, which has led to exponential growth in the options for data analysis. Theoretically, nearly 500,000 possible questions could be examined using Smartclip’s data. The only question is: Which ones are actually useful? What should you focus on in the evaluation?” asks Servatius, explaining the problem facing today’s evaluation algorithms. “The biggest challenge for our systems is to facilitate the efficient analysis of large amounts of data that leads to usable results. People can’t do it. For this, we need artificial intelligence and machine learning.” A topic which Smartclip has been addressing for some time now as well – and which Thomas Servatius finds “extremely exciting.”

More than 70 data dimensions

“We are currently training our systems to recognize what is worth analyzing and what is not, and then forward their evaluations or recommendations to human experts. Using the tools we provide, our customers can then, e.g., decide for themselves what they are interested in,” says Servatius, summing up the ongoing developments, which are based, among other things, on time-series analyses, whereby unusual and therefore interesting data constellations are sifted out. Initial versions of this already exist. The Smartclip manager believes it is only a matter of a few years before they can be used to their full extent to again give the company a competitive edge.

“Knowledge in the areas of artificial intelligence and machine learning also sets the standards in recruiting new employees,” says Servatius, describing another challenge facing the company. “We want to grow strongly in the European market now and develop our IT solutions into an open platform for European TV channels and streaming services. Naturally, we will need suitably qualified colleagues for this,” says the IT expert, who makes no exception for himself here. In addition to his job, he is currently completing a master’s degree in Data Science. On the one hand, Smartclip already works with the Group’s in-house corporate training unit, Bertelsmann University, to train its own employees in a number of special areas. And on the other, Servatius is pleased about the programs from the online education provider Udacity, whose key strategic investors include Bertelsmann. “Udacity offers a lot of compact courses in subjects that teach precisely the knowledge that is

relevant to us. We plan to make greater use of these offers as well in future – both for our current employees, and as a starting qualification for new hires.”

Collaboration within the Group is developing positively for Smartclip beyond Germany as well. “Of course, we built the technological basis for the delivery of commercials on all internet-enabled devices for Mediengruppe RTL Deutschland’s channels and streaming services,” says Servatius. “But we’ve already had a lot of conversations with Groupe M6 in France, Atresmedia in Spain, and RTL Nederland as well, who are also interested in our solutions,”

he says, happy about the inquiries received from sister companies. “This sort of collaboration is a lot of fun.” However, word of Smartclip’s special solutions is spreading even further: for instance, a major public-service broadcaster was won as a customer for audience measurement on addressable TV – precisely because

of the strict data protection regulations that Smartclip guarantees for all its customers. Now the goal is to keep moving ahead on this path, maintain the momentum gained, and steadily expand the business. Thomas Servatius and his team place a particular premium on personal communication and interaction: “In all our talks, we see how important mutual trust is. More and more customers are placing this trust in us by working with us in an area that relies on trust: data. We have the right offers and the right personnel.” Which is why he believes: “We’re only just getting properly started.” ■

→ www.smartclip.com

**“We want
strong growth
in the European
market”**

Thomas Servatius



Justin Boelio, Senior Director of Data Sciences
at Penguin Random House USA

Books Meet High-Tech

Justin Boelio is a data scientist at Penguin Random House. This position is no longer considered problematic in the 500-year-old world of authors, publishers, and editors – because they've all come to realize how well the Cloud, data, and artificial intelligence support their shared goal, i.e. turning a good book into a great success.

→ The time-honored book and cutting-edge high-tech; knowledgeable editors and savvy programmers; experienced publishers and cloud-loving data scientists – at today's Penguin Random House, worlds are constantly intersecting, with everyone, with their respective orientations, getting on surprisingly well together. As a result, the world's largest trade-publishing group enjoys the rank and reputation as the book industry's undisputed technology leader – as well as substantial year-on-year revenue increases for several years now. Penguin Random House has realized that new technology is excellently suited to potentially boost book sales. And because this is an opportunity worldwide, the publishing group has established the Global Data Hub, the largest publishing and international IT project in its history. It is managed by Justin Boelio, Senior Director of Data Science at Penguin Random House in the U.S. along with support of data and technology colleagues globally. The Hub integrates all of the company's publishers and publishing groups globally. Never before has there been this form of technology collaboration across the group.

Having data scientists like Justin Boelio working in book publishing has long since become commonplace, as has his leadership of a nine-person-strong data science team within the publishing group. “Penguin Random House has always been very strong and way ahead in IT matters,” says Boelio. For example, his team was set up eight years ago, while other publishers were said to still in a deep sleep regarding data science. While that has since changed, he says, Penguin Random House’s frontrunner role has not. It is interesting to note that tech enthusiasm by no means began here with the e-book; Penguin Random House knows how to capitalize on tech for the printed book business.

“Technology makes things scalable,” says Boelio. Sophisticated IT is used to manage storage, shipping, and just about everything else that happens with a printed book. And that’s not all: “Books often have a life cycle of decades that goes far beyond the creative process at the beginning – beyond its writing and publishing. The catalog and formats of available books with such a life cycle are constantly growing. Only technology is able to manage, optimize, and extend it for each individual book.”

“Penguin Random House has always been very strong and way ahead in IT matters”

Justin Boelio

The publishers appreciate this, of course. Although they work with highly creative people on sometimes highly sophisticated content, this doesn’t prevent the publishing staff from taking an interest in tech matters. On the contrary: “They’ve seen how much their work is supported by technology and how well it works,” explains Boelio. Moreover, because technology does not interfere or even influence the publishing decision-making process in any way, it has become an integral part of Penguin Random House’s business and culture over the years, he says. The publishing group has thereby created a foundation of inestimable value. And the more digital the industry becomes, the more important this will be. This goes for the sale of print books via online retail, as well as for the e-book business. Boelio, who sees himself as a “translator” between IT professionals and publishers, has tangible examples of both: the use of metadata and e-book pricing.

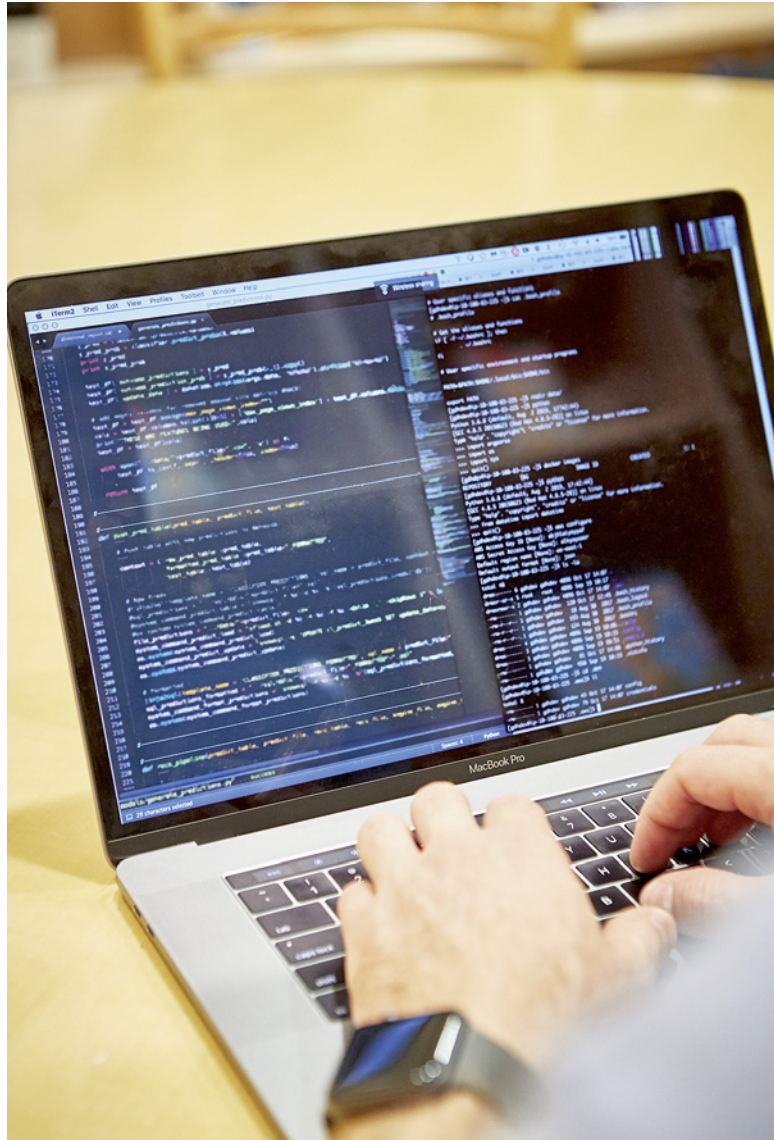
“There’s no question that tech giants like Google or Amazon are becoming increasingly crucial to the success of the book business,” admits Boelio. “We have to fight fire with fire here, and make sure that our books always get the best and most prominent placement, and that they are discovered online the

fastest.” With around 40 million book titles in the Amazon Kindle store alone, this is no easy undertaking, albeit a necessary one. “If we didn’t do this, we would mercilessly drown in a sea of books,” says Boelio, under no illusions. “Thanks to artificial intelligence and machine learning, it is now possible to link our books with keywords and metadata that make them stand out from the crowd.” He says this is all the more important because tech giants basically rely on search engine optimization. And there are already smaller publishers that now work on precisely this principle. In contrast to the traditional publishing protocol, the process does not begin with the content, but with a search term, around which a text or entire book is created in the second step.

Paradigm shift in price setting

Of course, this applies even more to the thoroughly digitalized e-book business, where no physical product is involved, from beginning to end. “While we sell a print book or an audiobook to the bookseller at the agreed wholesale price and leave the rest of the pricing to them, e-books are a different story,” explains Boelio. “Here, the publisher sets the consumer price.” And not once and for all, but repeatedly, thanks to artificial intelligence, because the conditions for what is the right price for a given book at a given time are subject to constant fluctuation. “Penguin Random House has about 60,000 digital products on offer,” adds Boelio. “Until recently, one or two specialists at each publisher analyzed sales of a handful of them – the most commercially important titles at that time – and adjusted prices.”

Since this task was taken over by artificial intelligence, the prices of 80 percent of the digital catalog are continually and dynamically adjusted. As a result, “the prices of the 5,000 most important e-books in the U.S. change at least once a week, and the prices of all 60,000 books are adjusted an average of six to eight times over the course of a year.” The effects of this can be seen very clearly in the figures: These price adjustments give Penguin Random House added annual revenues of around €5 million in the U.S. alone. An effort that was impossible for human intelligence has become routine thanks to its artificial counterpart. Another technological development was indispensable for this as well: “Without the Cloud, all this would be unthinkable,” says Boelio. “It has created a breakthrough for and leveraged the efficiency of computers.” IT has become fast, efficient, and stable thanks to the elimination of complex, expensive proprietary server infrastructures, he explains. The result: Penguin Random House’s US data infrastructure itself has been almost entirely in the Cloud for five years. Complete migration of other technology to the Cloud is the clear goal.



Artificial intelligence dynamically adjusts the prices of 80% of the digital catalog.

The Cloud offers another crucial advantage for the global publishing house. Accessible from anywhere at any time, it forms an indispensable technological basis for collaboration between IT specialists and publishers across borders and oceans – the kind of collaboration Penguin Random House is aiming for in its biggest-ever data IT project. It started with an analysis. “We asked our IT colleagues in all countries and at all publishers what they were working on, what challenges they face, and what solutions they are developing for them,” recalls Boelio. The result could not have been clearer: “The challenges were the same everywhere.” And because it obviously doesn’t make sense to work on the same issues at different locations in the same company, Penguin Random House set itself the ambitious goal of creating a unified IT environment that can be accessed by all the group’s publishers around the world – eliminating the previous redundancies, which tie up time and money.

“We wanted to guarantee that tech solutions, algorithms, applications, and software modules developed in one country could be used by colleagues in all other countries,” explains Boelio. But from the outset, the considerations went beyond this common IT working environment, the Collaboration Space: “Our goal was to also create a common database available to everyone, which would significantly strengthen Penguin Random House once again.” The idea for the Global Data Hub was born.

“A face-to-face meeting of data experts was the key moment in our work”

Justin Boelio

That was in May 2019, when data experts met in New York for the Bertelsmann Data Exchange, and colleagues from Penguin Random House tacked on another day, the crucial one, for a meeting of the publishing group’s data people. “Much as we love working remotely with tech, this face-to-face meeting of data experts from every Penguin Random House country, was the key moment in our work,” recalls Boelio. “We immediately saw that everyone was willing to exchange ideas and work together on an ongoing basis.” Since then, the publishing group’s data scientists and data analysts – there are about 100 of them – have formed four working groups that exchange information in weekly telephone conferences. They work on the above-mentioned topics of e-book pricing and metadata, as well as on personalizing end-customer and reader relations and the supply chain. The Steering Committee also discusses

new developments and ideas in a weekly conference call. Beyond this, a blog guarantees an ongoing exchange. And because face-to-face meetings are irreplaceable after all, the publishing group is planning the first Penguin Random House hackathon in 2020. “There’s a huge amount of enthusiasm in the data & technology community,” says Boelio.

Desire for collaboration

Meanwhile, the Global Data Hub, also known as the Global Warehouse, is increasingly taking shape. “The technological basis is in place. We’ve linked the individual company networks and rebuilt the firewalls accordingly,” says Boelio. Now comes the second step: “In the U.S. alone, we are transferring 200 terabytes of data to the Warehouse right now. Then we keep going, country by country and region by region. In total, we’re talking about an estimated 500 terabytes of data from several data centers.”

In fall 2019, the Warehouse is scheduled to be launched with a first data set. However, it will be many months yet, perhaps even a few years, before all the data from all the companies in the group has been added. “Systems vary from country to country and company to company, but we’re making very good progress because the data experts at Penguin Random House just really want to work together,” says Boelio. The need for this collaboration is equally great, because the book industry, too, must safeguard itself against increasing competition from global tech giants, whose data sets are truly invaluable. It is important to counter this with data of our own that is as big and as valuable as possible – the kind of data, in other words, that will arise from the Penguin Random House Global Data Hub. ■

→ www.penguinrandomhouse.com



Christina Dohmann, Chief Digital Officer at DPV
and Chief Distribution Officer at G+J

Big Data for More Subscriptions

DPV Deutscher Pressevertrieb intends to reach its customers even more personally, purposefully, and often by using data-driven solutions. The G+J subsidiary is working with Salesforce, a U.S. tech group, to achieve this.

→ Let's call her Sabine J.: She's 51 years old, likes to read "Brigitte" and has subscribed to the print edition of the women's magazine for several years. She also loves animals, cycling, and finds real-life crime cases absolutely fascinating. Sabine J. hardly ever uses social media, but can easily be reached by email, preferably in the morning at breakfast and the late afternoon after work. She recently took part in an online prize draw, which she read about in "Brigitte," where the grand prize was a four-day trip for two to Sylt. So might the current issue of "Stern" with the "North Sea" cover story perhaps also be of interest to Sabine J.? And does she already know about the "Stern Crime" paid-content model, where fans of true crime get their reading satisfaction? And whether it's "Animal Worlds" or "Germany's Most Beautiful Landscapes," Sabine J. would probably also be open to an exclusive offer for a "Geo" calendar.

Of course, Sabine J. doesn't exist: She is fictitious, but she roughly represents a customer DPV Deutscher Pressevertrieb might try to reach, day after day, with the magazines and products from Gruner + Jahr that are suitable for her interests. The G+J subsidiary intends to do this even more personally, purposefully, and often in the future – by using data-driven solutions. “Our goal is to make our customers the best offer at the best possible time on the right channel – and to do so across their entire customer lifecycle,” says Christina Dohmann, a native of Cologne who sits on the DPV Management Board in her role as Chief Digital Officer, and in her second role as Chief Distribution Officer at G+J supervises the publisher's entire distribution business. For Dohmann, it's an imperative that data and cloud technologies are crucial to achieving this goal and, as a result, sell more subscriptions. Because of the oversupply of content on the market and the multitude of content channels available to readers and users today, it is important to target them very precisely. “And we can only do so successfully if we know our customers as best as possible,” explains Dohmann. “We need all the data/information that helps us to do this in real-time, and really we can only evaluate and use it with the help of artificial intelligence at this point.” As she speaks, her excitement about the resulting potential clearly shines through her customary calm demeanor.

“Our goal is to make our customers the best offer at the best possible time on the right channel”

Christina Dohmann

“Customer centricity” is the catchphrase used in marketing-speak. It suggests that the entire communications and marketing around a product should be conceived not from the company's point of view, but from the customer's. And the icing on the cake is personalization through automation. To achieve this, DPV has been working with a U.S. tech group called Salesforce since the beginning of 2019. G+J Sales is successively deploying the group's cloud-based B2C solutions across its direct-to-customer business. “In a superb collaboration with Bertelsmann's Corporate Information Technology department, a Group-wide framework agreement was signed with Salesforce in January 2019, and technical implementation at DPV and G+J began immediately afterwards,” recalls Dohmann, adding that it took just six months to technically link five Salesforce clouds with G+J's subscription and DPV's CRM systems. Six

months is extremely fast, as the American company attested to its colleagues in Hamburg. “It helped that our Sales department has a lot of experience with the migration of data and systems,” says Dohmann.

The five clouds in question, which she and her Salesforce teams use, each have their own focus in their functionality, but are always interlinked, “in real-time,” as Dohmann points out, her enthusiasm once again shining through. The first cloud, named Heroku, can be seen as a data store in which all the customer data is pooled. “The second cloud is the Service Cloud, which we can use to control our campaign management and, in future, our customer service,” continues Dohmann. The centerpiece for the Sales team's work is primarily the third cloud, the Marketing Cloud. “This solution allows our marketing managers to set up automated campaigns that run across multiple marketing channels, called ‘multi-channel customer journeys’,” she explains. Specifically, this means that starting from a contact point with the customer, various possibilities for further interaction can be planned in advance and, depending on the customer's individual behavior, automatically played out.

Automated campaigns

Dohmann gives an example: “When someone buys a single issue in one of our shops, their ‘customer journey’ starts with a thank-you page in the shop. They then automatically receive an order confirmation by email and possibly also a letter from the Editor-in-Chief. After a few days, if it suits them and their requirements, the customer will be contacted by phone, and depending on their responses during the conversation, they will receive an offer for a trial subscription by post or an invitation to a survey by email.” The Marketing Cloud makes it possible to track, automatically and in real-time whether the recipient has opened an email, how long they spent reading it, and what they clicked on – and depending on the customer's behavior, the next logical step in the previously planned chain of measures is automatically triggered. In addition, if a customer's information changes, such as their last name following marriage, a new address, or new interests, this new information is immediately synchronized with the data in the Marketing Cloud. “As soon as a customer reports a name change by telephone to customer service, their name is even changed in an email that happens to be on its way out at the same time,” says Dohmann.

The fourth Salesforce cloud used by DPV is the Commerce Cloud. This is an innovative, high-performance shop platform that offers recommendations using a “recommendation engine,” i.e. an automated recommendation service. “Our goal is to migrate all of our 35 subscription shops to this plat-



In the 'Marketing Cloud' every plausible step of a so-called 'Multi-Channel Customer Journey' can be planned, automated, and – depending on the customer's behavior – played out.

form," the head of G+J Sales says. While the Marketing Cloud, as described, delivers an automated implementation of the marketing measures, the associated Commerce Cloud offers the opportunity to personalize the product range in shops. "So if it turns out that a customer is particularly interested in sports, for example, the shop would entice them with a bicycle as a bonus for a subscription, whereas a scarf might be offered to a different customer who is more interested in fashion," says Dohmann, giving examples for possible forms of personalization. Recommendations along the lines of "Customers who bought or viewed this product were also interested in this product" are also possible via the Commerce Cloud.

Finally, in the fifth Salesforce cloud, reports and dashboards converge with the help of artificial intelligence. "Salesforce's AI heart beats in the Analytics Cloud," says Dohmann. Salesforce calls it "Einstein" and it is also visualized in the form of a little comic man with the German physicist's characteristic mane of hair. Here, all data from the other four clouds is gathered and evaluated in real-time. "Based on this, predictions can be made – for example, which customers in a target group are very likely to complete a purchase. These findings are automatically transferred into ongoing campaigns and thus help to improve them immediately." This enables marketing budgets to be used much more purposefully and successfully than has been the case so far. "We are now able to address every customer individually based on the data – at the time and on the channel that best suits them personally."

"We are now able to address every customer individually based on the data"

Christina Dohmann

Christina Dohmann explains that G+J had, of course, worked with data-driven analysis and derived forecasts even before Salesforce was implemented. However, the cloud-based solution's major advantage over manual analyses lies primarily in the automatic linking of the data with specific marketing measures across various channels; in shop offers that are more precisely tailored to the customer; and in the individual design of customer-service conversations. "And we can and will learn a lot of new things in this way," she says happily. In setting up a "customer journey," she and her team relied on their previous practical experience and marketing expertise. "We're not starting from scratch, after all: we already know a lot about our target groups

even without Salesforce,” she says, “but the new data and AI options allow us to determine much more accurately whether our hypotheses are right – and if by using Salesforce we find out that we’re wrong with one of our hypotheses and need to fine-tune it, I’m happy. Because that’s how we learn and are sure to uncover potential for further business.”

It’s still too early to cite concrete findings arrived at by working with Salesforce, says Dohmann. But, she adds, during the implementation process she already observed that the step towards a data-driven world of work means a change not only at a technical level, but also within the team culture. “This is a completely new approach, especially for the colleagues in marketing. On the one hand, it is a challenge, but on the other it is incredibly exciting and opens up entirely new opportunities.” Dohmann is convinced that the suc-

cessful introduction of the new form of working will have to be a team effort. “This can’t be ordered from the top down. We want to discover, together, what value-add these tools bring for us – through many workshops in which colleagues introduce them, through newly formed teams of experts who are familiar with the individual clouds, and above all, through a lot of trial and error.” The whole effort, she says, is an ongoing transformation process in which learning by doing is the order of the day.

Dohmann points out that the simple and intuitive web interface of solutions such as Salesforce make it easier for colleagues who have had little contact with the topic to start doing data-based work. However, it also changes the role of staff in the Service and Marketing departments, says Dohmann. “It is essential to develop a certain understanding of how today’s new technologies work and what opportunities they offer.” To do this, customer service employees or marketing managers don’t have to become data scientists – the latter handle entirely different tasks anyway. “But they need to understand how to handle the technology to ultimately achieve the goals they want to achieve.” Dohmann is confident that it will work. “The opportunities and potential that Salesforce offers the Sales team are truly enormous. And by integrating it into our existing subscription systems, we aim to stabilize our subscription business and even expand our subscription revenues despite the difficult sales markets.” So, the idea is to get to know customers like Sabine J.

“The opportunities and potential that Salesforce offers the Sales team are truly enormous”

Christina Dohmann

even better in future, and to determine which products and magazines can enrich her everyday life – in order to make Sabine J. an offer that she simply can’t refuse ... because it is just right for her. ■

→ www.dpv.de



Beate Steinicke, Director of Royalties Data Services & Solutions, and Gaurav Mittal,
Vice President of Group IT & Systems at BMG

Machine Learning for More Efficient, More Accurate Work

Every month, BMG's Royalties department receives millions of pieces of song-usage billing data. Machine learning ensures that an ever-increasing amount of this data is automatically checked and processed. Soon only 24,000 songs per year will need to be checked manually, instead of 1.2 million songs as before.

→ BMG is synonymous with world-famous artists and exciting newcomers, well-known record labels, and over 870 committed employees around the world who make the Bertelsmann subsidiary – re-established in 2008, one of the world's most successful music companies. But it's not just BMG's commitment and creativity that are world-class – the same goes for the IT infrastructure behind it, which forms a framework, without which neither the business model nor the enormous, sustained growth would be possible. And without this high-performance IT, BMG would not be able to deliver the many valuable services that make the company so popular and vital with artists around the world. Last but not least, BMG's IT department ensures that the musicians receive the royalties they are entitled to – from countries all over the world and for all types of music use; be it music publishing rights, income from albums sales and streams, or the use of music in television series or commercials. This involves receiving, recording, comparing, and evaluating millions of pieces of data every day. And to ensure that this happens ever faster,

more accurately, and more efficiently, BMG's IT team is constantly working on improving processes. One of the ways it does so is an increasing reliance on machine learning, i.e. self-learning processes.

The fact that BMG develops and operates IT at the highest level is all the more remarkable since there are hardly any existing software solutions for the music company to draw upon. "We actually built the core of our IT ourselves, with the support of external program developers, because there are simply no off-the-shelf software solutions on the market for music companies of our size to buy," says Gaurav Mittal, Vice President Group IT & Systems, whose international team is responsible for a large part of this development work. BMG outsourced 100 percent of the actual programming work, and Mittal estimates that around 80 to 90 external programmers work full-time on the further development of BMG's IT systems.

One of its current machine-learning projects has the potential to support the employees of BMG's important Royalties department, in particular, where the royalties payable to a given writer from various sources are recorded and collated. Such sources could include, as an example, the databases of music-collecting societies in individual countries – such as GEMA in Germany – which collect royalties when a piece of music is publicly performed or played on the radio. Over the years, with the constantly growing number of artists and songs managed by BMG, the amount of data that needs to be processed by the Royalties department has grown significantly. "The biggest problem here is to match the data coming in from many different sources in different formats with our data," says project manager Beate Steinicke, Director, Royalties Data Services & Solutions, from the Royalties department. "Smart Match" has been used to automatically match this incoming data with BMG's data since 2013. This means that even small errors such as variations in the spelling of song titles or names of artists and songwriters can be automatically detected and correctly matched using text comparison during this step. "96 percent of the incoming data is already automatically matched thanks to Smart Match," explains Gaurav Mittal.

But even Smart Match encounters its limits with four percent of the data supplied, i.e. with four percent of the songs reported to BMG that are subject to billing. "And we're talking about some 1.2 million songs a year here, a huge number that has to be manually checked by our colleagues, song by

"We actually built the core of our IT ourselves"

Gaurav Mittal

song," says Beate Steinicke, a mathematics graduate who has been with BMG for seven years. This has entailed an additional checking process, she says, in which the manually matched data is spot-checked a second time. To further automate this complex process, Gaurav Mittal and Beate Steinicke launched a new project at the beginning of last year, which, in an additional process step, uses machine learning to automatically assign songs that were previously manually processed. "This can only be done with machine learning, i.e. a self-learning system, since the data supplied is not static, but is itself subject to change," says Steinicke.

Manual and machine-learning matching

And learning is exactly what the machine-learning system with its intelligent algorithm is currently doing. In March and April 2019, Mittal and Steinicke, with the support of external programmers, tested the system for the first time in a pilot program to determine whether it had the potential they hoped for. This was the case, and so the system is now running in learning mode parallel to the conventional system. "This means that we run both processes – manual matching and machine-learning matching – in parallel and then compare them," says Mittal. The goal is, of course, to achieve the highest possible consistency between the two processes. "Once we reach about 97 or 98 percent correspondence here, we will switch from manual to automatic matching." At the moment, the rate of correspondence is still below 90 percent. "But we think we'll be there by the end of the second quarter of 2020," says Steinicke. The project manager expects that the number of songs requiring manual matching will drop from 1.2 million to only about 24,000 per year at that point. And then her colleagues in the Royalties department will have more freedom to devote themselves to other tasks of royalties accounting. "With less manual matching our colleagues will be able to focus on quality rather than quantity," says Steinicke.

Meanwhile, Gaurav Mittal is already envisioning other major IT projects to improve BMG's IT performance, likewise based on machine learning. "I like these projects because they are very real and tangible and directly lead to results," says the IT expert, who studied computer science and has been working at BMG IT for eight years now. Together with his team, he is currently examining ten use-cases for machine learning at BMG. One of these projects, the next on his list, centers on the question of how machine learning can be used to check incoming payments, or rather, how missing payments can be automatically detected and reviewed. "If, for example, Netflix pays for the use of a BMG song in one of its series, and these payments suddenly stop, the system



In BMG's Royalties department, the royalties due to a particular songwriter from different sources are collected and combined.

“With less manual matching our colleagues will be able to focus on quality rather than quantity”

Beate Steinicke

must recognize that something is not right,” says Mittal. The same would also apply if royalties for a current hit are being paid from all European countries except for one. “In the future, the system will be able to detect such unusual deviations and flag them for further review.”

Discovering new music talent

Another project, which is still a vision of the future, however, relates to talent scouting, a music company's traditional A&R work. “Here, machine learning could help to discover new musical talent by having the system systematically search for them on the internet,” says Mittal. If, for example, a new song by a previously unknown artist attracted the positive attention of social media users, it is hoped that machine learning would help to discover it more quickly. “Our A&R colleagues could then approach this artist even earlier,” believes Mittal.

In addition to machine learning, Mittal also sees great potential for BMG IT in the field of robotic process automation (RPA). “RPA is about linking and automating recurring and successive processes,” says the IT expert. An RPA process was recently implemented, for example, in which the accounts of the platform BMG Songs were linked with the superordinate BMG Finance department and Bertelsmann's SAP system.

“Machine learning and RPA enable us to become more efficient, flexible, and accurate,” says Gaurav Mittal, “and that will become even more important for our business in future than it is today.” ■

→ www.bmg.com



The Afterpay product team: Espérance Gottmer, Jan-Peter Radtke, Jisu Song, Alexander Scheibel, Robin Nijkamp, Kalle Hillfelt, Patrik Vikner und Mikko Koskenoja (left to right)

New Payment Paths for E-Commerce

Afterpay, a service provider that is part of Arvato Financial Solutions, provides consumers with convenient payment solutions. The internationalization of these services had to take into account the consumer habits of the respective countries, as the example of Germany demonstrates.

→ The digital revolution over the past two decades has fundamentally changed the way people buy and consume products and services. As one example, experts estimate that electronic commerce will account for significantly more than ten percent of all trade in Europe in 2019, representing a volume of about €330 billion. Even when consumers shop in a physical store, roughly two-thirds of them compare competitive prices on their mobile phone. E-commerce is expected to continue to grow and to reach more than 20 percent of the trade volume by 2023, with a volume of around €430 billion. Afterpay, part of Arvato Financial Solutions, provides the appropriate payment solution – Payment After Delivery (PAD) – which makes it an important contributor to Arvato Financial Solutions (AFS) as a growth platform. Alexander Scheibel, Director of Product; Patrik Vikner, Head of User Experience and Jisu Song, Service Optimization Specialist at Afterpay, explain how Afterpay takes on the challenge of excelling in the B2C market.

The rapid development of e-commerce has triggered the advance of contemporary payment solutions tailored for online services. A prime example of such a service is Payment After Delivery, which enables the consumer to separate purchase from payment. Its most common form, invoice or 'auf Rechnung,' emerged from the mail-order era. Mail order, which also helped Bertelsmann grow with its book club, had big successes during the second half of the 20th century, especially in the German-speaking markets. And while Bertelsmann certainly has gone through a digital transformation since the "Buch Club" days, so too has Payment After Delivery.

In the early days of e-commerce, earning trust among consumers was one of the main challenges online retailers faced. Online shops wanted to come across as trustworthy, by giving consumers a safe and secure feeling as they entered the unknown online territory – which is why they had to bring PAD to the worldwide web. "Allowing people to first receive their purchase before having to pay for it was essential. This was the perfect use case for the classic 14-day invoice," explains Alexander Scheibel, Director of Product with Afterpay. Once fashion retailers made it into the world of e-commerce, around the millennium, the need for online PAD solutions kept growing. Besides the wish to pay for a purchase at the moment of receiving their purchased goods, consumers wanted to first feel, try on, and experience their items before paying, just like they were used to when buying in physical stores. The notion of "try before you buy" became the second main driver for not paying immediately, and the popularity of 14-day invoices continued.

Merchants are facing intensified competition that drives them to a consumer-centric approach. For them, offering the correct payment methods is crucial. "Today, roughly a quarter of European consumers prefer paying after delivery," notes Alexander Scheibel. This clear consumer preference has led to a highly competitive market situation in many areas, including the lending and banking sector, where the traditional players were joined by a sprouting of new players often referred to as Fintech companies. Within the payment industry, these players would be Klarna, Paypal, Mash, Ratepay, Qliro and, of course, Afterpay; a growth story that has been part of Arvato Financial Solutions since 2015.

"The control Afterpay brings its users gives them a sense of freedom"

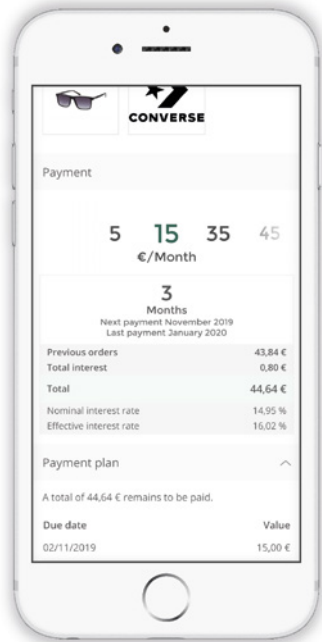
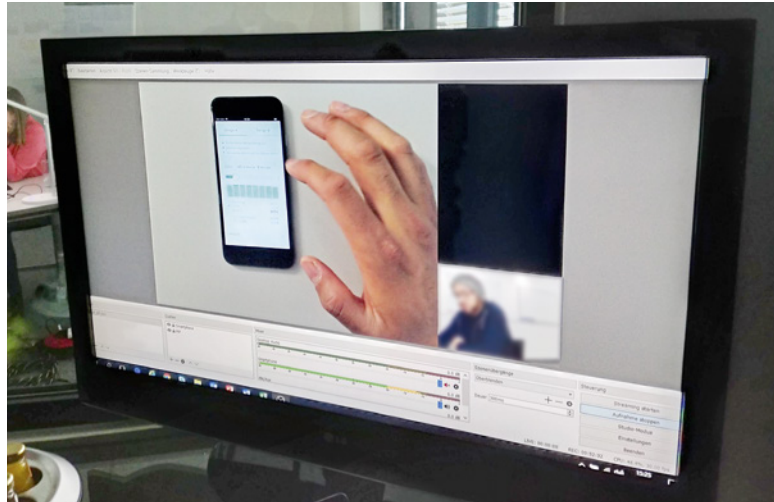
Patrik Vikner

Afterpay as a consumer service is built on the belief that consumers want to feel they have control over their purchases, both online and offline. The company's research has also shown that consumers demand a high level of transparency from online services. Understanding who is behind a service, how it works, and whether it can be trusted are everyday challenges that consumers face. Control, overview, and adaptability are exactly what Afterpay wants to offer consumers – not only in the classic mail-order countries, but beyond. As such, Afterpay is currently offered in nine European countries – they include Germany, Austria and Switzerland, Benelux and the Nordic countries. "A consumer survey in the Dutch market concluded that the control Afterpay brought its users gives them a sense of freedom. Freedom to explore and benefit," says Patrik Vikner, Head of User Experience.

Continuous analysis of user behavior

Where Afterpay in the beginning relied on insights gained from third-party research and other second-hand insights, e.g. reports by Post Nord or GfK (German Society for Consumer Research), they have since made a shift to creating first-hand insights from self-initiated research. "Market reports are important to get validations about larger trends, but they can rarely support you on service-critical decisions the same way as first-hand insights," says Service Optimization Specialist Jisu Song. To this end, the Afterpay product team is staffed with specialists focusing on User Experience and Consumer Service Optimization. They drive programs for continuous insights and analysis using the latest tools for monitoring user behaviors, as well as both quantitative and qualitative studies in Afterpay markets. This allows Afterpay to better understand what is required in order to be relevant to users, and to navigate in such a way as to stay relevant. By monitoring and analyzing user behavior at the various service touchpoints like the smartphone app, web portal, consumer emails, SMS notifications and of course the checkout, they can keep the company apprised about how well the service is doing, and where it might be improved.

To successfully conceive, design, and develop a service that resonates with users in a way that makes them think "Aha! this looks like something I should use," you need to paint a bigger picture. That is why, to be able to fully understand consumers, Afterpay also wants to understand their lifestyle, attitudes and everyday struggles. Patrik Vikner notes that many insights may be product- and function-related, but the underlying emotions are at least as, if not more, important. "Our users don't see shopping as transactions, so neither can we if we want to succeed. That's how we tackled the challenge of bringing split payments to Germany," says Patrik Vikner.



Above: Consumer tests investigated how the test subjects used Afterpay’s Flex-App.
 Left: In the app, one can immediately see how much the monthly instalments will be.

“Consumers want to be able to buy things when they are actually needed”

Alexander Scheibel

A vital pillar for PAD revenue has always been late fees. A user forgets to pay on time and gets charged an extra €2.50. However, according to Alexander Scheibel, the future lies not in fines, but in providing services that users are willing to pay for instead. “If we want to be a preferred service provider for consumers, we can’t achieve that with ‘punishments’ such as late fees as our chief source of revenue. People will see right through that. Instead we need to create services that empower customers in a way that they see the worth of paying for it – like Flex,” says Alexander Scheibel. Flex is Afterpay’s recently launched online split-payment service for consumers in Germany, and soon the Netherlands as well. Split payments, or installments, have been around for many years, provided by banks and financial institutes in most of the Afterpay markets. They have mostly been aimed at high-cost purchases such as furniture, refrigerators, or washing machines, where a consumer then chooses an installment plan for repayment over a fixed time period. But where these setups were limited to one purchase at a time, Flex allows for a more dynamic behavior aligning with emerging consumer trends. Alexander Scheibel explains, “Consumers want to be able to buy things when they are actually needed, not only when they have money in the bank. With the increasing number of online purchases, existing solutions could not cater to that, given consumers’ increased demand for overview and control, for a sense of freedom instead of worrying about payments. Afterpay Flex is the answer to these needs as it allows consumers to merge multiple purchases into one payment plan,” he adds. “Flex users decide the monthly spend on their Flex plan themselves, giving them freedom through flexibility and control.”

Multiple purchases collated in one payment plan

Launched this summer, Flex is already a success in Germany, but getting there was a bumpy road, and required the Afterpay team to take a leap of faith. Over the past few decades, an archetype model for this type of payment solution, known as “minimum to pay,” grew out of the Nordics, where companies like Afterpay, Klarna, Qliro and others have provided it online successfully for many years. Bringing it south from the Nordics down to the continent was therefore a logical step. It would not be without its challenges, of course, but little did the Afterpay team know what awaited them. Or as Patrik Vikner puts it, “We hit a brick wall.” The German word for debt translates loosely into ‘guilt,’ heavily affecting how it feels for a German to enter into a financing agreement. Add to that the postwar maxim of “Sparen, sparen, sparen” (scrimp and save, scrimp and save), and the fact that installments in Germany have been free of charge, serving as lures for banks to catch new customers.

That was the setting into which Afterpay wanted to introduce paid consumer credits as a lifestyle.

Afterpay as an organization relies heavily on user-centric development processes. So despite having a successful predecessor to Flex already up and running in the Nordics, the product team ordered the existing setup to be tested with German consumers. And that turned out to be a good thing. In all, more than 30 consumers participated in the German cities of Hamburg, Dusseldorf, and Cologne. It was decided to test experienced shoppers first, as they would be most likely to relate to the service.

First out was Hamburg: The results were devastating. Not a single participant could relate to the service. Apparently, everything was wrong with the service from a user perspective.

It cost money, it was after delivery, it was not Paypal. “In User Experience, ‘everything wrong’ is actually not a bad place to be, it sets a platform for engaging users. It’s much worse if they just shrug and say ‘meh,’” explains Patrik Vikner.

The summary of the findings provided the team with some insights and an opportunity for innovation.

But this would require the organization to completely move out of its comfort zone and revisit the very core mechanics of how split payments are managed. Apart from Flex not being Paypal, two major challenges were identified: cost and effort. The German test persons felt they would be paying for a service where they do all the work themselves. Each month, pay the installment with interest. This perception is critical to note because single-purchase installments in Germany are not only interest-free, “apparently, they are also fully automated. A complete behavioral antithesis to the Nordics,” Patrik Vikner concludes. This presented Afterpay with a number of challenges at different levels. Can a service where you continuously add new purchases, thus making it inheritably unpredictable, be automated? How can cost be made to feel meaningful?

After multiple iterations and design sessions involving representatives from all parts of the organization, a new service draft was presented. It was based on two main hypotheses:

First: Users primarily relate to the monthly cost, and second is time. Setting a fixed monthly amount instead of a fixed time span would allow for the

“Afterpay Flex is a living service and needs to be nurtured properly in order to grow”

Jisu Song

service to be predictable even if new purchases were added. Second: Users can relate better to the actual monetary-unit cost of interest than the interest in percent. Instead of only showing that the payment plan had an interest rate, it would also convert that to an actual money amount owed by the user.

For the upcoming user tests in Dusseldorf and Cologne, the new service design was made into a useable prototype and designers were on standby to tweak it through rapid prototyping between test sessions, based on user reactions and reflections. The user response was overwhelmingly positive. Ultimately, the battering ram that broke through the brick wall was showing the actual cost of the interest. “When you see an interest value as a percentage, of course you are hesitant, because it doesn’t tell you the amount of money you exactly pay for interest. But when you see that postponing a €500 payment might only cost you a handful of euros, then suddenly it’s a tool and not pain,” says Patrik Vikner.

Positive user reactions

In July 2019, after months of preparations, Afterpay Flex launched in Germany with a first merchant partner. The entire service platform had been rebuilt to ensure that the qualities required at launch were there, but also to ensure the technical stability to build upon as the service grows to maturity. The single-merchant launch was a deliberate strategy to maximize early insights and to minimize potential consequences of undiscovered issues. As part of the strategy, there was no advertisement of the service, neither by Afterpay nor by the merchant. The plan was to see whether users would find the service, whether they interacted with it, and whether they chose to convert. Expectations were humble.

“Afterpay Flex is a living service and needs to be nurtured properly in order to grow,” says Jisu Song. She leads the Optimization team, a group dedicated to gathering and analyzing every piece of a data that exists on Flex, for the purpose of ensuring the number one KPI: repeat usage. She remembers, “When Flex was launched we really didn’t expect much traffic, so we were definitely surprised by the turnout.” The team had expected to track users in the hundreds, and conversions in the tens; instead, it turned out to be users in the thousands, and conversions in the hundreds. This put a lot of pressure on the team to fine-tune their data collection and aggregation in a short amount of time. “That summer was just crazy. We had a number of hypotheses to validate and elaborate on, while at the same time we were searching for hidden flaws that needed fixing,” says Jisu Song. She highlights one issue they found in particular, an error that generated false negative conversions due to



Patrik Vikner,
Head of User
Experience at
Afterpay



Alexander Scheibel,
Director of Product at Afterpay



Jisu Song, Service Optimization
Specialist at Afterpay

a very specific timeout error that could occur during the flow. “Had we only been sitting with the financial systems and Google Analytics, this would have gone unnoticed forever, making it look like users bounced for no particular reason.”

Now, a few months later, Flex is sailing along steadily and the next stage approaches: making Flex available for all German Afterpay merchants in time for Black Friday in late November. Spirits are high; the data shows high acceptance and appreciation for Flex among German consumers. Jisu elaborates: “After just a few months, we’re already seeing a number of encouraging indicators for Flex. First, the demographics are much broader than for your standard 14-day invoice; second, repeat usage is growing steadily; and third, a high number of conversions are achieved within two minutes, which shows that users feel the control and freedom we wanted to bring them. So, we are really on our way now – providing continental Europe with a lifestyle payment method that is fit for the future.” ■

→ www.finance.arvato.com



Benjamin Räthel, Daniel Böske and Torsten Bresser from Arvato Supply Chain Solutions (left to right)

On Top of the Supply Chain Data Mountain

As an international service provider that offers more than just traditional supply chain management, Arvato Supply Chain Solutions has an extensive inventory of information at its disposal. The Bertelsmann subsidiary has access to data from end customers, clients, suppliers, transport service providers, and other subcontractors – and uses it to make processes along the value chain more efficient, cost-effective, and faster.

→ It happens with every click in an online shop, every package that's loaded into a truck, and with every ring of the doorbell that announces a courier with a package under their arm at the front door. Regardless of where you are in the supply chain, vast quantities of data are collected. And as a service provider that offers far more than just traditional supply chain management in this market segment, the mountain of data that Arvato Supply Chain Solutions sits on offers an extremely wide vista. The internationally operating company possesses an extensive inventory of information, as it manages the entire value chain, and thereby has access to data from end customers, clients, suppliers, transport service providers, and other subcontractors.

Three colleagues are particularly well-versed in what exactly can be achieved with this data: Torsten Bresser and Benjamin Räthel, heads of the two Data Science teams at Arvato Supply Chain Solutions, and Daniel Böske, Business Intelligence Leader in the Consumer Products department. Räthel says that data science and business intelligence in supply chain management may have once sounded like dreams of the future, but today they have become decisive in predicting tomorrow's reality. Whether "predictive analytics" is used to calculate forecasts for orders or returns, or to automatically generate invoicing of services for customers, new technologies and the minds behind them make it possible to process various orders along the supply chain more efficiently, cost-effectively, and faster.

Räthel says that business intelligence and data science, which are closely related but still separate disciplines, offer various opportunities here. "Business intelligence is mainly about preparing and evaluating data in retrospect. Data science, on the other hand, uses data in a way that allows predictions to be made about the future using algorithms and machine learning," he explains. Räthel has been with Arvato Supply Chain Solutions for five years and began his career there in the area of business intelligence. After shifting his focus to data science in 2017, he has held a management position in this field since January 2018. His colleague Torsten Bresser, who trained as an IT specialist at Bertelsmann, and began his career 20 years ago at Arvato, adds: "In business intelligence, people draw conclusions from data; in data science, machines do this. So, one makes people smarter, the other, machines." For instance, he explains, photos can be used to teach a computer to recognize the condition of cardboard boxes. The machine can learn to detect whether they are undamaged, wet, or crushed, and automatically carry out such classifications in future. "Whereas in business intelligence, the focus would be on the question of how many boxes were undamaged, crushed, or wet, and actions would be derived accordingly," says Daniel Böske, clarifying the different questions that business intelligence and data science address. He joined Arvato Supply Chain Solutions three years ago, worked in the same Data Science team as Benjamin Räthel for a while, and is now responsible for Consumer Products.

The data basis, however, is the same for everyone, so the "beating heart of

"In order to learn, algorithms need to be fed as much as possible"

Torsten Bresser

data" for all three colleagues and their teams is the central data warehouse at Arvato Supply Chain Solutions. All of the raw data that can be obtained from SAP systems or web shop transaction data, e.g., is depicted here in usable data models. Billions of pieces of information are gathered here, forming the basis for all of the data experts' downstream operations. And the more data, the better, Torsten Bresser tells us. "In order to learn, algorithms need to be fed as much as possible. That's why the big tech companies like Google and Facebook are so successful – because they have vast quantities of data." According to Bresser, Arvato Supply Chain Solutions, with its wealth of information that people alone cannot even grasp, is also very well positioned in its market segment, and has the potential to develop into a "supply-chain Google," as Christian Kille, Professor of Retail Logistics and Operations Management, calls it in an interview with the Bertelsmann subsidiary.

Significant cost savings

In returns logistics, for example. More than ten million returns pass through Arvato's logistics sites every year. To manage the volume of returned products as effectively as possible and make optimum use of warehouse staff, Benjamin Räthel and his team program algorithms that analyze and evaluate all possible influencing factors that might lead to a return. "For example, the number of sales in the previous weeks is taken into account, as well as seasonal factors, or the order structure. If, say, a consumer orders exactly the same T-shirt in two sizes, the probability that one of them will be returned is very high," explains Räthel. "The algorithms learn to recognize such patterns and calculate corresponding predictions." In turn, the data science experts forward the forecasts to the warehouses' employees so that they can more accurately plan their deployment of staff. If a peak, i.e. a particularly high volume, is to be expected for returns as well as for orders, a correspondingly large number of employees are planned for. If less is expected, fewer people are planned for, or staff are deployed to another station where they may be needed more urgently. "For us and our customers, this means significant cost savings. And the end consumer is also satisfied because this helps shorten the time between order and delivery or return," says Räthel.

Meanwhile, the Business Intelligence team examines the question of why products are sent back and the possible consequences. For example, after evaluating the returns Daniel Böske and his colleagues may come to the conclusion that a product description is not suitably formulated or that a marketing campaign for a product is not having the desired effect. If the Bertelsmann subsidiary is also responsible for running the web shop, colleagues can use



Know in advance, how many packages roll round: with the help of algorithms it's possible to calculate forecasts of order volumes, among other things.

the findings from the data analysis for practical purposes and improve an item's description in the online shop, e.g.

Böske says the productivity reporting that he and his team introduced last year is also part of business intelligence, and proceeds to cite a few more examples from his daily work. He tells us that productivity reporting involved reviewing and evaluating all the data at all Arvato Supply Chain Solutions Consumer Products sites in Germany. Among other things, the amount of incoming and outgoing goods, and returns, was compared with the total number of hours worked by employees. "This enabled us to define productivity across individual sub-units or individual customers, compare the individual sites with each other, and find out where there was potential for improvement."

Efficiency in the warehouse

Another catchphrase in the data world of Arvato Supply Chain Solutions is "warehouse optimization." Torsten Bresser explains that a "warehouse heatmap" is one of the methods used here. "To maximize the efficiency of order picking in the warehouse, it is important to keep distances as short as possible. Accordingly, where products are placed in the warehouse plays an important role." Generally speaking, a warehouse is always divided into different sections. "The first section, the A section, is where 'highrunner' products are stored, i.e. items requested very frequently, such as video games." The B section contains items that are in less demand, and the C section is home to products that tend to be rarely ordered. The warehouse heatmap visualizes the warehouse from a bird's-eye view and shows which items are processed most frequently in a certain period of time in the warehouse and where – and can therefore make suggestions for possible relocations in order to increase efficiency. When new products arrive at the warehouse, it is also possible to calculate a trend for their sales and thus determine their optimum placement from an order-picking point of view. Benjamin Räthel adds that items aren't simply classified as an A or B product and then stored somewhere in the A or B section. "Algorithms enable us to individually analyze sales for each product, which lets us determine the ideal location in the warehouse for each individual case." Here, too, he says, there are interfaces with the Business Intelligence team, which prepares and evaluates details on individual processes in the warehouse in reports.

Another still relatively new project that the Data Science teams under Torsten Bresser and Benjamin Räthel are currently working on is aimed at optimizing transport management, which Arvato Supply Chain Solutions also offers its customers as a service. Räthel says that many customers have previ-

ously relied on relatively rigid rules when choosing a carrier, i.e. the supplier who delivers the products to the end consumer. “Carrier A has always been chosen for express deliveries in country A, Carrier B for refrigerated transports in country B, and so on,” he says, giving an example. “However, because we work with so many different suppliers, we can generate a huge amount of data here as well – such as where, when, and how a carrier works best, and which carrier would therefore be best for a given job. Even the parcel delivery companies themselves don’t possess all of this information, since they usually only have an overview of their own services, and cannot make comparisons with competitors. At Arvato Supply Chain Solutions, however, this treasure trove of data can be used to make customer-specific predictions about which carrier is the best choice for which service for delivering its products in which country and even which postal code area. “This is a unique selling point that Arvato Supply Chain Solutions has in the market. It enables us to improve our own internal processes on the one hand, and on the other we can offer it as a service to our customers,” says Räthel.

The three experts at Arvato Supply Chain Solutions are convinced that despite the many forecasts that can be made with the help of algorithms, one thing cannot be predicted in the field of data science: whether the programmed algorithms and machine learning will actually function as planned in practice. This always means testing, testing, testing, they say. “We do actually have to keep reviewing whether the algorithms are working and doing what they are supposed to do,” explains Torsten Bresser. So, the three colleagues believe that their human expertise will

“This is a unique selling point of Arvato Supply Chain Solutions”

Benjamin Räthel

probably continue to be in great demand in future, as business intelligence and data science will continue to play a major role in supply chain management in the years ahead. “New use cases are being added, and existing ones expanded – the potential is far from exhausted,” says Bresser confidently. “In the future, for example, we will be able to systematically use findings from our ‘warehouse heatmapping’ when we win a new customer and have to stock their warehouse for the first time. Or perhaps in future ‘our’ algorithms will be able to support logistics-engineering colleagues in the optimal layout of a warehouse by making informed suggestions.” So, the outlook remains excellent, from atop the high mountain of data at Arvato Supply Chain Solutions. ■

→ www.arvato-supply-chain.com



Bernd Loseke, Director of Sales Utilities at Arvato Systems

A Smart Service Provider for the Energy Sector

With the cloud-based Arvato Energy Platform, Arvato Systems supports Germany's energy sector in mastering current and future challenges and developing future-proof digital business models. These include the generation of renewable energies, decentralized storage, and electromobility. Bernd Loseke, Director, Sales Utilities at Arvato Systems, explains what makes this platform the leading offering of its kind in the German market – and why data is so important in this business as elsewhere.

→ Households and businesses in Germany will soon see the digital future reflected in their electricity meters as well. For decades they were used to the sight of black boxes containing a spinning wheel; its speed showed how much electricity was being consumed at a given moment. The exact measurement is performed by an analog counter, which is read once a year by the electricity producer. Starting in 2020, these boxes will gradually be replaced by intelligent measurement systems consisting of smart meters and certified gateways, which will be able to report their measurement data continuously and at any interval, no matter how short, to authorized persons. Initially, this will be done for larger consumers and producers such as businesses, and later for private households as well. The new system will provide the data basis to better coordinate power generation and demand – and thus facilitate the desired

energy transition towards more environmentally friendly sources. Arvato Systems supports the management of the complex processes in Germany's rapidly changing energy sector with the Arvato Energy Platform. It is a cloud-based platform that relies on vast volumes of data and can be used in a variety of ways, as Bernd Loseke, Director Sales Utilities at Arvato Systems, explains.

Renewable energies – primarily from wind power and photovoltaics, but also from hydropower and biogas – are on the rise worldwide. In Germany alone, according to the Federal Ministry of Economics and Energy, their share of gross electricity generation in 2019 amounted to 43 percent by the third quarter. And this share should continue to rise, or at least this is the aim of the German government, so as to reduce the emission of greenhouse gases such as carbon dioxide and counteract climate change. "This poses great challenges not only for German energy producers, but also for grid and plant operators," says Bernd Loseke. "They have to manage the energy transition against a backdrop of market regulations that have been continuously evolving for years – and the transformation to digital on top of that. And we can help them with both." The

Arvato Energy Platform gives the Arvato Systems experts a comprehensive set of IT solutions that already delivers many things that companies in the energy market will need in the future. Companies can flexibly serve their market role and specific needs from this platform, adapt solutions by configuration if necessary, or even have them newly developed, instead of having to handle everything themselves or buying all-in-one solutions that are less tailored to their needs, as they have in the past. "We act as a business enabler and support our customers in professionalizing their core business, while at the same time enabling them to introduce new digital business models and products that they would not be able to realize so quickly on their own," says the Arvato Systems Manager.

The Arvato Energy Platform's flexible, modular solutions cover a wide range of functions. Initially, the focus will be on "market roles" with a great need for digitalization, i.e. plant managers, energy suppliers, distribution network operators, and meter operators. Plant managers, for example, operate all kinds of power plants. Energy suppliers purchase this electricity – usually through a service provider – and supply it to end customers, which in turn requires distribution network operators who route the electricity through

**"We
act as a
business
enabler"**

Bernd Loseke

their networks. Finally, meter operators are the companies that measure electricity consumption and forward the data to the authorized companies. Arvato Systems currently serves customers from all these segments, all over Germany. "In particular, we go above and beyond the standard processes to offer them a way to establish new digital processes, because the profit margins in the energy sector's traditional business models are constantly declining," explains Bernd Loseke. "Also, the existing IT structures are not up to the increasing requirements due to ever more detailed market regulations and ever more data; and it's rather difficult to quickly establish new IT skills given the general cost and competitive pressure." As Loseke sees it, energy suppliers are subject to the "4D trend": after decarbonization through the desired energy transformation, and decentralization and democratization through local, increasingly citizen-owned, generation and storage, they now additionally face digitalization – Arvato Systems' specialty.

Scalable IT infrastructure

And that includes everything from automation to time-series management. "The digitalization of businesses calls for a scalable IT infrastructure, i.e. one whose scope of services can be expanded as needed, and where customers will only be billed for what they have actually used," says the Arvato Systems Manager, describing his company's pay-per-use approach. "All this is possible with the cloud-based Arvato Energy Platform. Our platform combines the existing solutions from our Smart Energy Platform with those of Next Level Integration, the subsidiary we acquired in 2017, as well as other providers as needed, into one product with a uniform database, integrated process flows, and high automation capability. There is currently no other solution on the market that offers such a wide range of features from a single source," emphasizes Bernd Loseke. The rising demand confirms the great interest among customers.

"To get a more concrete impression of the platform's functionality, it makes sense to look into the future a bit," says Loseke. For example, the volume of recorded data will increase exponentially with the intelligent measurement systems and additional sensors that will be required in future, he says. This creates the data basis for smart systems operation: plant operators can predict the demand for electricity and heating, as well as market prices, and optimize their operations in this respect. Grid drivers will soon be able to forecast grid loads and give notice of bottlenecks so that grid users can respond by, for example, providing charging recommendations to drivers of electric cars to avoid overloads. So the idea is to manage the large number of



The Arvato Energy Platform functions as a kit full of IT solutions for the energy industry in Germany – and perhaps also in other countries soon.

producers and storage facilities and, soon, increasingly consumers as well, for the purposes of achieving an overall optimum. The Arvato Energy Platform makes this task much easier, as it can record, process, and combine not only the measured energy values, but also all types of sensor data. On the other hand, it provides general cross-cutting functions as well as specialist processing and analysis options that can be flexibly combined.

But the platform goes one step further. Besides the established market roles, it also supports new smart processes and business models. In the past, the energy supply system was dominated by the operation of a few hundred easily controllable power plants. Today, there are already around two million decentralized generation plants, a whose number will continue to rise, but whose production depends on the weather and can therefore only be controlled to a limited extent. Additional elements such as heat pumps, electric cars or flexible storage tanks must also be taken into account. So efficient operation requires ways to forecast both consumption and generation, as well as new concepts for managing the large number of generation plants. All this is only possible with detailed, resilient data, small-scale control options, and intelligent algorithms.

The Arvato Energy Platform can play to its strengths particularly in the area of these small-scale systems: Such a system could, for example, be a residential district, where the intelligent measuring systems precisely record the individual consumption points and producers such as photovoltaics and combined heat and power plants. This can be supplemented with further information such as heating demand, position of the temperature controllers, open windows, or use of charging stations. This creates a digital map of the neighborhood. The

“There is currently no other solution on the market”

Bernd Loseke

residents use an app to submit their wishes or requirements for heating or charging an electric car, while the neighborhood manager defines overarching objectives such as minimizing costs or maximizing internal consumption. All this information can then be combined into a meaningful whole by artificial intelligence to provide information on how the cogeneration unit should be controlled and how the electricity and heat stores should be used. It is also possible to offer neighbors their own surpluses or to buy surpluses from them. A similar procedure is also conceivable for shops or industrial buildings – and in some cases is already a reality.

In all these cases, the Arvato Energy Platform, with its myriad options for data collection and processing and the integration of artificial intelligence methods provides an ideal basis. Artificial intelligence also simplifies digital communication with customers, for example, through intelligent chat bots. Experience has shown that more than 90 percent of all inquiries contain recurring standard information. The AI can independently filter this out and thus “intelligently” answer the next requests. This allows experts to concentrate on more complicated cases and thus better help customers.

“The exciting thing about the Arvato Energy Platform is that its systematically specialized modularization means that the modules can be combined quite easily and are therefore suitable for very different business processes,” explains Loseke. So it can support energy market roles such as meter operation and energy supplier, as well as the management of charging points for electric cars, including the billing of charging processes, or the environmental data reporting for companies large and small, from any industry. “In all cases, smart meters or sensors on machines measure energy and commodity flows as well as other system data and send them to us to be centrally recorded. Our modules can automatically generate the energy and CO₂ monitoring from this, and calculate measures to achieve energy efficiency targets or climate neutrality,” continues Loseke. And thanks to its modular approach, the Arvato Energy platform is also adaptable and expandable. “We are constantly developing new modules to close existing process gaps. We have already convinced many large and small customers of our service to collect all these huge amounts of data from market participants, analyze it, and make it available systematically.”

These customers include one of Germany’s four transmission system operators, as well as a number of municipal utilities, and operators of decentralized generation plants. To date, the Arvato Energy Platform has been geared to the German market. “This market in itself is already large and very attractive for us,” says Loseke. “We are well positioned here and are constantly expanding our customer base.” An expansion to the Austrian and Swiss markets is quite conceivable, he says. “And many of the features can be used worldwide, so that, in principle, there are prospects here as well.” ■

→ www.arvato-systems.de

“We are constantly developing new modules to close existing process gaps”

Bernd Loseke



Eva Schmidt, Team Leader of Customer Insights Mobility,
Retailer and Program at DeutschlandCard

From Data to Customized Customer Interaction

The multi-partner rewards program, DeutschlandCard, part of the Bertelsmann Printing Group, relies on a variety of methods and techniques that help its many partners address consumers and potential customers at the right time on the right channels. They are based on various options for analyzing existing data, as Eva Schmidt, Team Leader Customer Insights Mobility, Retailer and Program at DeutschlandCard, tells us.

→ With increasing digitalization, consumer expectations have also risen continuously in recent years. Loyalty to a particular shop or brand is no longer the only thing that counts when making their purchasing decisions. Rather, they expect individualized offers that are precisely tailored to their life situation, their pressing needs as a consumer, and their preferences regarding the communication channel – and under no circumstances do they want to be barraged with a flood of inappropriate, impersonal advertising messages. A vendor who cannot ensure this risks having customers switch to the competition. To prevent this from happening, companies must be (pro)active, take their customers' expectations seriously, and fulfill them. "So the be-all and end-all for vendors is to know the wishes and needs of consumers, ideally

even to anticipate them, and to transfer the insights gained into optimized, effective one-to-one communications,” explains Eva Schmidt, Team Leader, Customer Insights Mobility, Retailer and Program at DeutschlandCard. The company, part of the Bertelsmann Printing Group, has operated a customer loyalty program since 2008, and now has more than 20 million program participants who can collect points at more than 10,000 points of sale (POS) and more than 400 online shops. According to the company, the program is one of Germany’s largest rewards programs and also one of the country’s highest-reach marketing platforms. Its biggest partners are Edeka, Esso, and the Netto discount supermarket.

These days, customized customer interaction and communication almost inevitably involves the use of data. And for good reason, nearly all companies are now addressing this topic with programmatic marketing. They try to collect as much customer data as possible, and generate business-relevant value-add from it. Programmatic marketing relies on algorithms that process customer in-

“The great added value lies in the evaluation of the information”

Eva Schmidt

formation to manage and implement marketing measures. “But even if it is clear that the use of this information can significantly support companies, the acquisition, processing, and data protection-compliant, targeted use of relevant customer data still presents major challenges for many companies,” says Schmidt. One company that has been successfully doing business in this field for over ten years is DeutschlandCard. “Our program’s strong development depends above all on the secure and data protection-compliant handling of data,” she emphasizes. “Only if consumers know that the company will handle ‘their’ information with care, and that they simultaneously get added value as a result, will they be willing to use the program and disclose data. She says this system of give-and-take really works at DeutschlandCard: “The large number of participating partners from a wide range of sectors – including supermarkets, petrol stations, travel agents, home textiles and office supplies – gives us a high degree of relevance to people’s everyday lives. So program participants not only enjoy using the card, but they also use it very frequently, since they can redeem the points collected for rewards, have them offset against their purchases, or donate them,” says Eva Schmidt.

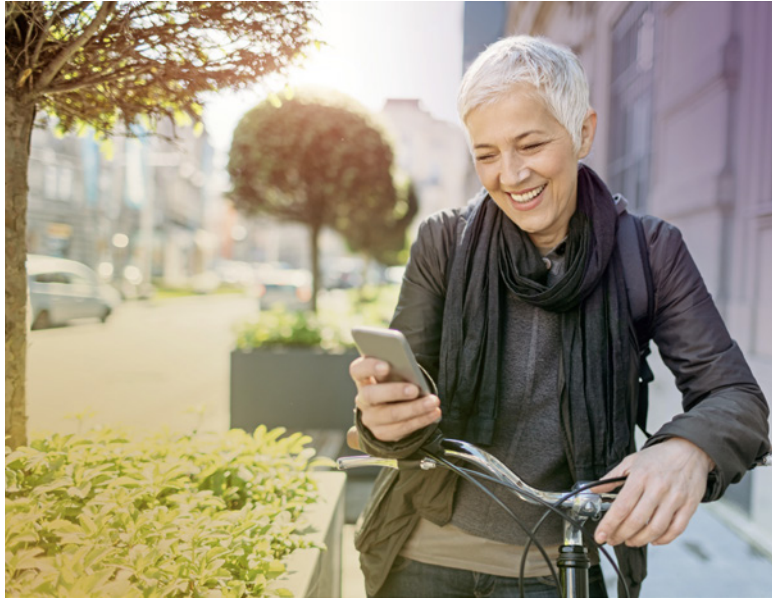
Every use not only increases the number of points in the participant’s account, but also adds to the DeutschlandCard database. Information about the

participants becomes available to DeutschlandCard as soon as they register for the program – provided they have given their consent to the use of the data. “Besides sociodemographic data such as age and gender, we also know their place of residence, which is enriched with regional structure data – purchasing power, community size or building typologies – at microcell level,” the expert continues. “We also record, for example, which partners the program participants shop with and what products they purchase.” Campaign data is also collected, she notes: What campaigns did a participant receive and how did they respond to them? On which channels are they best reached? This information, too, is recorded and transferred from the various source systems to the DeutschlandCard database. This gives the program a very broad database. “But data alone is not enough,” points out Eva Schmidt. “The art and hence the great value-add lies in the evaluation of this information. To generate real customer insights, which form the basis for customer-focused communications, from the data, the information is prepared, logically linked from a business perspective, and evaluated across the board using data analysis.” DeutschlandCard uses four different types of data analysis for this purpose.

Customer segmentation

“First, there’s Descriptive Analytics,” Eva Schmidt explains. “To quickly gain a first impression of the consumer, traditional key performance indicators or KPIs of various characteristics such as sales volume, points collected, or number of card uses, can be used for a first approximation.” Another way for companies to better get to know their customers and their needs is customer segmentation. “‘Descriptive Analytics’ is used to analyze the existing data on existing and potential customers in a descriptive way, and to define segments that are as clearly delineated as possible based on this,” the DeutschlandCard expert continues. “The segmentation could be based, for example, on similarities in purchasing patterns and preferences, or on sociodemographic characteristics. This kind of information helps companies to better understand who their target groups are and how they differ from each other.”

There are a lot of questions that can be answered using this kind of segmentation. “Segmentation is suitable for tracking important developments in the customer base and deriving the necessary marketing measures from them,” explains Eva Schmidt. “For example, it allows companies to look at the customer lifecycle. This variant makes it clear at a glance how the customer base is distributed over the various phases of the lifecycle – new customers, existing customers, reactivated customers, or inactive customers – so that



DeutschlandCard uses different types of analysis to effectively approach potential customers.

suitable measures can be developed based on this information.” Depending on the question, a combination of purchasing frequency and quantity of purchased products, or a segmentation according to product categories could also be helpful – for example, if a company wants to develop consumers with regard to purchase quantity or frequency, or to promote sales of certain product categories. “However, given the limited selection of criteria and influencing factors, the descriptive analysis procedure is relatively imprecise,” Schmidt tells us. “So segmentation is not enough as a basis for decision-making in campaign planning or target group selection. Other procedures and methods must be used for this purpose.”

For example, the second one in Schmidt’s enumeration, Diagnostic Analytics, deals with the question of “why?” “While descriptive methods and their presentation in reports show what the customer structure looks like or which campaigns were successful, diagnostic analytics techniques help to answer the question of why indicators are the way they are,” she explains. “Because here, the initial connections between individual indicators are mapped.”

DeutschlandCard uses comprehensive “dashboard solutions” among other things. They make it possible to detect correlations in the data, offer quick access to the information, and allow for various kinds of data evaluations. Dashboard solutions thus create a 360-degree perspective of consumers by taking into account different perspectives of the customer relationship – region, point of sale, shopping cart, campaign response, contact points, and communication channels. The applications also provide intuitive graphical interfaces that are not only suitable for analysis by data experts, but can also be used as self-serve solutions by business users. For instance, DeutschlandCard, uses transparent, graphically-supported analysis paths to generate deeper insights into program participants, and can uncover potential for new campaigns while simultaneously identifying “pain points” in customer-relationship management.

“Companies can better understand who their target groups are”

Eva Schmidt

“Using these dashboards, users can answer initial analysis questions at a glance,” continues Eva Schmidt. “DeutschlandCard set up a separate portal for participating partners, among other things. This portal enables vendors to see various key indicators of their sales outlets at a glance, such as the number of

card uses, the number of active participants, and even the penetration rate. They can also easily place them in relation to other indicators, such as the regional location of the point of sale, and the associated subscriber potential. “On this basis, dealers can better understand the needs of the participants at their location and can directly develop measures for a given location that are tailored to its respective customer structure.”

The third type of analysis used by DeutschlandCard is “predictive analytics” to anticipate customer behavior. “Both ‘Descriptive Analytics and Diagnostic Analytics’ combine participants into groups to get an initial picture of indicators and simple correlations, which then serve as starting points for further measures,” says Eva Schmidt, describing the two models. “However, this is not enough for customer-focused communications – for which,

ideally, companies have to predict which customers are likely to behave in a certain way in the future. Relevant questions could be, for example: Who is at risk of switching? Which customer can be activated by a campaign? On which channel will he respond? Which offers are attractive and relevant for customers?” Schmidt says predictive analytics can be used to answer these questions.

“Dealers can better understand the needs of the participants at their location”

Eva Schmidt

DeutschlandCard has introduced a highly automated “scoring engine” for this purpose; it creates powerful scoring models for business-related questions in the future by linking data from a variety of sources. This engine provides automated modelling and validation. Finally, the individual probability of a given target value happening for a participant – e.g. the probability of them becoming a new customer of a partner company – is calculated using classical regression models as well as decision-tree-based methods. “This method can also take a large number of variables into account,” explains Eva Schmidt. “Nor are consumers assigned to a fixed group. For example, there are not just pure online or pure offline buyers. Instead, an individual value is calculated for the customers, which can be interpreted as a probability for a certain behavior. For example, it can be determined that there is a 75-percent probability of customers responding to an app push for a fueling special. Or that 82 percent will redeem a coupon for six times the usual points on fresh vegetables. So unlike segmentation, scoring provides individual probability values for the various target groups.

Says Eva Schmidt: “Scoring techniques make it possible to tailor target group selections from the total inventory as well as to address the participants most likely to respond. This allows the vendor to play out messages even more effectively and, of course, also use the distribution of incentives in a more targeted way.”

High relevance and appeal

The fourth form of analytics used at DeutschlandCard is Prescriptive Analytics, the highest discipline of them all. Prescriptive Analytics can help answer the most complex questions,” says the DeutschlandCard expert. “Such methods make it possible to determine the best recommended action for ensuring that the shopping offers have the greatest possible relevance and appeal for customers. The models derived from the analyses ultimately manage the contact route to consumers on their path to buying a product. Because the goal is always to provide the right customer with the right offer at the right time, on their preferred channel.” And, she says, this technique gets you as close as possible to the objective. In the past, campaigns were often planned and managed as stand-alone measures. “So it could and still can easily happen that customers receive a great many offers from several vendors during particularly marketing-intensive periods such as Easter, Christmas or Mother’s Day, while during other periods they may receive only a few to no information and offers,” Schmidt explains. “This is why DeutschlandCard and its partner companies have started to develop and implement cross-partner and cross-program contact plans. Analytical models such as forecasting or time-series analyses help to group customers according to their shopping frequency, channel affinity and coupon redemption behavior and, building on this, to set up purposeful, long-view measures that increase partner and program usage.”

Contact strategies coordinated over a longer period of time also ensure that the multi-partner rewards program participants receive a minimum and a maximum number of contacts based on rules of contact and specific priority regulations. “Besides a long-view contact strategy, there is, of course, always the option of reacting at short notice to a specific behavior or change in behavior,” says Eva Schmidt. Comprehensive monitoring and early-warning systems have been developed for this purpose, e.g. to prevent the threat of customer attrition. “When certain threshold values are exceeded, this triggers an automated communication on the channels to be activated at short notice.” The DeutschlandCard multi-partner rewards program uses these findings and mechanisms for various campaigns. For example, in order to keep consumer

activity at a consistently high level, a contact route adapted to the customer lifecycle was developed that also takes into account the participants' preferred channel. For example, the first use of a card at a participating company leads to partner-specific "onboarding," which leads to different communication routes depending on the reaction – or lack of reaction. "In this way, existing customers, among others, are regularly contacted on their preferred channels, at optimum intervals," explains Eva Schmidt. As soon as a decline in turnover is observed or even just threatened by scoring, other automated regulations take effect, which send these participants a corresponding campaign to avoid their attrition.

"In this age of digitalization, consumer expectations with regard to the shopping experience have changed enormously," concludes Schmidt.

"Today's shoppers expect a shopping experience with a broad yet bespoke offer, competent consultation, and just in time product availability. And the more individual the offer, the more likely it is to really strike a nerve with the customer and awaken their desires." To offer consumers and potential customers the desired customer experience, in which they are addressed individually, compa-

"A personalized customer approach promotes customer satisfaction"

Eva Schmidt

nies need the corresponding, relevant customer information. "By taking a holistic view of customers across transactions, channels and contact points, the DeutschlandCard offers multi-layered customer knowledge that uses various analyses to visualize the many different facets of the program participants and reveal how to get consumers excited," says Eva Schmidt. "As a result, both DeutschlandCard and its participating partner companies can better understand the increasingly complex wishes of their customers, take their interests into account in the communication and design of their products and services, and use them to create an individual approach with personalized campaigns and recommendations, at the right time and on the right channel. Companies aren't the sole beneficiaries of this approach. "A personalized customer approach also promotes customer satisfaction, because the shopping experience becomes more satisfying for the consumer as well. And that has a positive and lasting effect on long-term customer loyalty." ■

→ www.deutschlandcard.de



Andy Vaughn (left), President of the Alliant International University, speaking to students.

A Digital Information System for Everyone

The new “Student Information System” enables students at the Alliant International University, which is part of the Bertelsmann Education Group, to organize their studies entirely online. The new platform went live last November and is available to all 3,780 students at Alliant’s six campuses in California. Nearly 40 percent of Alliant students complete their studies primarily online.

→ Until a few weeks ago, students at Alliant International University in California had to log into various information systems, pick up the phone, or go ask for information during office hours if they wanted to enroll for courses, find out results, check on rooms and times, complete academic exercises, or contact faculty and staff. But since last November, this jumble of information is a thing of the past: that is when the university launched an updated and comprehensive Student Information System. Now their entire academic course of study at Alliant can be planned and managed online – which greatly facilitates matters not only for the students, but also for Alliant’s staff. Today, all of the 3,780 students at the six Alliant campuses in the cities of Fresno, Irvine, Los Angeles, Sacramento, San Diego, and San Francisco can organize their studies entirely online.

However, it took quite a while before the university reached this point and could claim to have successfully arrived in the digital world. When Alliant was acquired by the Bertelsmann Education Group in 2015, the university's various locations didn't even have fully functional Wi-Fi, most notably not at its largest campus in San Diego. And it offered hardly any online courses or degrees. "Alliant was late in the game on digital transformation," recalls Andy Vaughn, President of the university since 2016. "Part of the reason Alliant struggled at the time was that the market was already asking for digital options and Alliant was resisting that." The acquisition by Bertelsmann fundamentally changed this, says Vaughn. From that time on, "digital first" became the maxim, and the market, i.e. the students, responded extremely positively to it. Since 2016, Vaughn adds, numerous online offerings have been created, so that nearly 40 percent of Alliant students now complete their studies mainly online.

"We'll always have an on-the-ground presence"

Andy Vaughn

The university, whose oldest parts date back around 110 years, currently has two main growth areas of academic focuses: various psychology degrees, and teacher training. "We've really concentrated on the programs that need a licensure in the U.S.," emphasizes Vaughn. "State licensure really is key." This is because students in the U.S. are increasingly studying what is mandatory for a direct route to a job – not least because of the high costs of studying. The era of studying out of pure interest or inclination is largely gone, he says.

Alliant has expanded its online offerings and invested in its IT infrastructure since 2016. It has also resulted in the closure of some international locations and many courses that did not fit in with the new strategy. In addition, the management was able to reduce annual fixed costs, such as rental costs for real estate. "We considerably reduced our overhead costs, but were able to increase our revenues by expanding our online offering," says Christoph Winter, CFO of Alliant, about the turnaround, which has led to the university returning to operating profit today. "Simplification and playing to our core strengths led us to success," emphasizes Vaughn, "which is why since 2016 we have concentrated on our core subjects of psychology and teacher training, which together accounted for 85 percent of our business at the time."

"Going digital has been an important part of our strategy ever since," says Vaughn, adding that Alliant introduced a number of innovative online courses,

particularly in the area of teacher training, that made high-quality studies possible even online. "Academic excellence is a big part of Alliant's unique selling proposition, and we wanted to guarantee that this quality would be maintained online." Despite the rapid online growth – online courses already make up Alliant's largest campus – Andy Vaughn does not expect Alliant to ever become a pure online university. Like most of the country's successful universities, "We'll always have an on-the-ground presence," says the Alliant President, because in the U.S., where there are only few supracountry universities, the vast majority of universities traditionally have strong regional ties. And contrary to what one might assume at first, these regional ties, California in the case of Alliant, are further strengthened by online degrees. "The past few years have shown that the majority of online students live within a 100-mile radius of the campus's on-ground presence," explains Vaughn. It's important to note that in California, the heavy traffic means that a distance of 15 to 20 miles can easily mean a one-and-a-half to two-hour drive, he says. "Thanks to our online service, we're now reaching students who may live 100 miles away." So the potential target group for Alliant degree programs has been significantly enlarged by the online degree programs, he says.

Alliant's unique selling point

While establishing the online campus, technology, IT, and data also became more and more important for Alliant. "An important part in U.S. higher education is the culture of the organization, building trust among teams, getting the right people on board and in place to ensure academic quality," says Vaughn. Right behind this are the topics data and technology, he says. "Technology is transforming our business," emphasizes John Jennings, CIO at Alliant. Since 2018, Alliant has implemented the new Student Information System (SIS). The academic side of the university also had its requirements for a modern SIS. "The top priority for us was to increase the degree of self-administration by the students," says Diana Concannon, Associate Provost and Dean who provided content-side support for its launch. "The SIS is something like Alliant's flagship, and we wanted also the user experience to be noticeably improved for the students."

After a project term of about 15 months, Alliant's new SIS went live last November. "This was the biggest technology project in Alliant's history," says John Jennings proudly. At Alliant, a total of about 20 employees were involved in the project to various degrees, while as many as 13 external experts worked on it. One of the biggest challenges was the integration of the old data files that had accumulated over the past years of the university's operation.



Alliant International University's campus in San Diego.



Graduation ceremony at Alliant International University's campus in San Francisco.

The advantages for the students are obvious, but what opportunities does the new SIS offer the university? “We can now monitor our students’ progress more closely than before, information flows faster, and it reinforces the students ties to Alliant,” says Diana Concannon. The new SIS also immediately lightens the workload on the staff, she says. “They no longer need to answer recurring or organizational questions, but can focus on more difficult questions.” And last but not least, adds Alliant CFO Christoph Winter, the new SIS, which replaced several old systems, will save the university around \$1 million a year in licensing costs. As the new Alliant SIS is a scalable system, new campuses can also be integrated. The university is working on geographical expansion inside the U.S. Alliant recently applied for and received a license to train teachers in the neighboring state of Arizona. “Here we have our eye on the Phoenix metropolitan region with its population of around five million,” says Andy Vaughn.

“Technology is transforming our business”

John Jennings

Following the introduction of the SIS, the Alliant team is working on a new topic: the use of artificial intelligence at the university. “We see great potential for the use of AI in five areas: teaching, performance evaluation, the timely recognition of deficits in students’ performance, marketing, and the simulation of practical-training content,” says Vaughn. Alliant will continue its work accordingly – and the next major technical project will probably not be long in coming. ■

→ www.alliant.edu



In 2018 Bertelsmann Investments launched the 'Inntro' initiative, where individual companies and branches of Bertelsmann meet with selected start-ups.

“We Learn from Startups”

Through its active participations in about 190 startups worldwide, Bertelsmann has invested in some very promising companies, in the process securing access to expertise and exciting business ideas in the field of technology and data. Through its Digital Partners division, Bertelsmann Investments also arranges collaborations with startups or established tech companies without owning a stake in them.

→ Bertelsmann wants to become the technologically-leading media, services, and education company. The Group is primarily building up the expertise for this tech leadership aspiration in its own companies – but also acquires it via the Bertelsmann Investments (BI) corporate division. Through BI and its four investment funds Bertelsmann Asia Investments (BAI), Bertelsmann India Investments (BII), Bertelsmann Brazil Investments (BBI), and Bertelsmann Digital Media Investments (BDMI), Bertelsmann invests in promising startups with a clearly digital and scalable business model. “These investments are of high strategic relevance to us,” says Shobhna Mohn, Executive Vice President Growth Regions Strategy and Bertelsmann Investments. “These fledgling companies benefit from Bertelsmann’s global network and the experience of our investment managers and industry experts – and we in turn can learn from them, especially when it comes to the innovative use of new technologies.” In some cases, pathways were even found for Bertelsmann businesses to cooperate directly with the startups. Collaborations can range from joint

product development to the marketing of Bertelsmann offerings on the startups' digital platforms.

The 190 startups in which Bertelsmann Investments owns a stake are almost exclusively digital companies, e.g. in the E-Commerce and Financial Services sectors. More than a quarter of these young companies also have a business model based on the current technological megatrends of artificial intelligence, virtual reality, cloud computing, big data, blockchain, and the Internet of Things. About half of these companies are based in China, and the shares in them are owned by BAI – the largest investment fund under the Bertelsmann Investments umbrella – which is managed by Annabelle Long. Most of these technology companies are active in Enterprise Services, i.e. services provided to companies. “Our startups bring valuable expertise into the Group, and we are working to further expand this exchange,” says Jörn Caumanns, CFO of Bertelsmann Investments. “But it also shouldn't be forgotten that the sale of holdings has made a significant contribution to Group profit in recent years. Beyond the transfer of know-how, we will keep striving to achieve above-average value gains and significant financial returns from our tech investments as well.”



“These investments are of high strategic relevance to us”

Shobhna Mohn

Fully eleven of the especially digital and tech-driven startups are based in the Enterprise Services sector. This sector is becoming increasingly important for companies worldwide, because machine learning, blockchain, big data and cloud computing can simplify processes and save costs. For example, the Chinese startup Black Lake Technologies provides a digital collaboration platform for production processes in factories, which can be used to gather, visualize, monitor, and do real-time analyses of production data. Black Lake, a Bertelsmann Asia

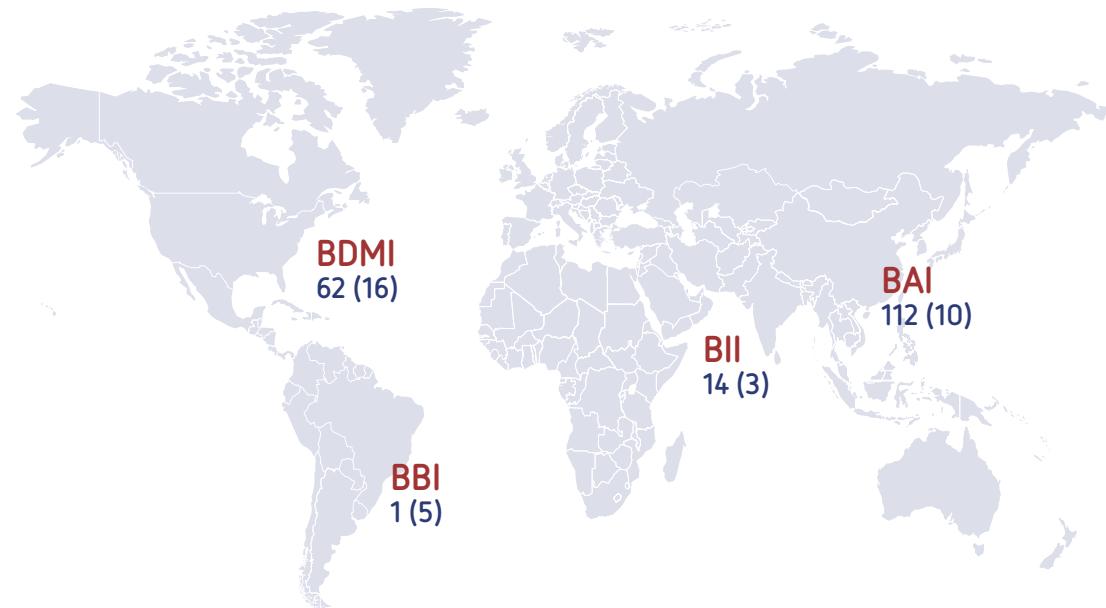
Investments holding, is a software-as-a-service (SaaS) provider that supports companies in their digital transformation. Rising wages, along with the current tensions in foreign trade are leading to growing cost pressure on Chinese producers – and to increasing demand for services such as those provided by Black Lake.

Another example in the Enterprise Services sector is Shiprocket, a Bertelsmann India Investments portfolio company and Indian SaaS provider that supports retailers in the country with their e-commerce business logistics. Retailers can organize the entire shipping process for online orders using Shiprocket. They can enter customer orders, choose one of the numerous logistics service providers, and ship the purchase orders. Once the order has been handed over to the respective service provider, both the retailer and customer can track the status of the order at any time. More than 25,000 companies and brands currently use Shiprocket's service, making it India's number one startup even ahead of a comparable Amazon service.

Leading in India

One business area that stands for digitalization more than almost any other is e-commerce, i.e. online retail. The big online retailers Amazon and Alibaba tower above the others here, but there are successful startups in this field as well that are challenging individual business models, products, technologies, or services with their clever ideas and new technologies, and in some cases completely replacing them. One startup with this sort of disruptive potential is the Indian company Licious, in which Bertelsmann India Investments also owns a stake. Founded in 2015 and having grown by more than 300 percent in the past financial year, the startup reports that it is now the leading online vendor of fresh meat and fish products in India. Technology plays a decisive role here: Each product is given a unique identification number that allows it to be tracked throughout the entire supply chain – “from farm to fork” – for quality assurance. Licious has a large customer base: The company says 90 percent of customers order food via the website at least once a month.

LetsTransport, another company in the Bertelsmann India Investments portfolio, optimizes logistics in cities by making data-driven forecasts of demand for logistics services, thereby optimally managing supply and demand. Founded in 2015 in Bengaluru, the startup transfers the business model of transport service intermediaries such as Uber to the logistics sector. Its offering for companies and private customers covers what is known as the “last mile” and, thanks to its technological expertise, the company is in a position to increase its transport partners' efficiency by around 40 percent, while at



Bertelsmann Investments is directly involved in 189 start-ups worldwide, in addition to investments in other funds (numbers of the latter in brackets).

“Our startups bring valuable expertise into the Group”

Jörn Caumanns

the same time reducing distribution costs for corporate customers by around 30 percent. As LetsTransport CEO Pushkar Singh told the Tech Crunch website last December, India spends about 14 percent of its gross national product on logistics, while in the U.S. it is only about 7.5 percent. “This is a very big industry that is ripe for disruption,” says Singh.

In China, the startup company Mioji uses big data and artificial intelligence to enable individual travelers to create and book entire travel itineraries with just a few clicks, including alternative routes and means of transport. Founded in Beijing in 2014 and part of the Bertelsmann Asia Investments portfolio, the company’s name means “brilliant idea” in Chinese. Mioji evaluates travel websites as well as social media sources in dozens of languages, bringing together billions of pieces of information in a structured database, linked by an automated understanding of content. Using this data, the Mioji platform automatically combines flights, train connections, rental cars, and hotels, as well as tickets for concerts or sports events, into a complete travel itinerary.

New business approaches time and again

In the media industry, i.e. the content business, digitalization is already well advanced. Technological innovations continue to lead to new business approaches. Bertelsmann Asia Investments owns a stake in the Chinese startup VeeR, which collects and distributes virtual reality and 360-degree video content from professional and private users on a central platform. In China, where gaming and digital entertainment are very popular, this is a rapidly growing market. The platform offers content for a wide range of VR technologies, including Oculus, Steam VR, and Samsung Gear VR. VeeR currently offers more than 10,000 VR videos, VR photos, and VR applications. Experts like the U.S. market research institute Gartner expect VR technologies to spread to the mass market in the next few years. Bertelsmann Asia Investments has another startup with a VR focus in its portfolio: Source, a young company that aims to offer leading applications for VR/AR users worldwide.

The U.S. startup FloSports, in which Bertelsmann Digital Media Investments has held a stake since 2016, relies on live streaming. FloSports operates an online video network with 25 sports channels. Subscribers can pay to watch a variety of niche sports events in real time, including wrestling, boxing, volleyball, rodeo, rugby, and wrestling.

Artificial intelligence and big data are coming to play a more and more important role for Bertelsmann Investments holdings in the Marketing and Advertising sectors. This is especially true when it comes to analyzing large

amounts of data and preparing it in a way that makes it easy for entrepreneurs to make informed business decisions. For example, the U.S. startup, Art19, in which Bertelsmann Digital Media Investments has been a shareholder since 2017, offers technologies for monetizing podcasts and analyzing audiences. Pathmatics, another BDMI holding, is a marketing intelligence platform that allows its customers to gain concrete insights from large volumes of marketing data through analysis and visualization.

Artificial intelligence is also the focus of two of the Indian fund BII's fintech holdings: The financial services provider Lendingkart, founded in 2014, provides loans to small businesses and SMEs, using a specially developed algorithm and thousands of different data points to assess its borrowers' creditworthiness. The financial services provider Rupeek, founded in 2015 in Bengaluru, uses image recognition to assess the authenticity and purity of gold as collateral for consumer loans.

In Brazil, the education provider Afferolab, in which Bertelsmann Brazil Investments has held a 100 percent stake since 2018, also relies heavily on technology and data. As the largest provider in the Brazilian corporate-training market, it uses "machine-learning recommendations" to be able to suggest individual learning offers to every user via learning platforms and learning apps. Thanks to progress in natural language processing, the work of human teachers can now be complemented almost seamlessly with machine interactions.

Building technological expertise through investments is one kind of opportunity for Bertelsmann Investments. Another lies in cooperation with startups or established tech companies without acquiring a stake in them. Bertelsmann Investments has set up a separate unit for such collaborations: Digital Partners. "With its global network and diverse range of possible applications, Bertelsmann is a natural partner for young, innovative startups, even if they are not looking for an investor," says Minoo Zarbafi, Senior Vice President at Bertelsmann Investments and Head of Digital Partners. This is precisely why Bertelsmann Investments launched the "Inntro" initiative last year, in which Bertelsmann Investments brings together individual companies and divisions from the Group with selected startups whose solutions and products have a large overlap with their business.

"Bertelsmann is a natural partner for young, innovative startups"

Minoo Zarbafi

One such startup is Crossing Minds, a Silicon Valley company that Penguin Random House works with. Crossing Minds, whose founding fathers also include Udacity founder Sebastian Thrun, specializes in one of the great challenges of the book publishing business, a "pain point": automated recommendations. Which titles and authors, which genres should be recommended to readers on which occasions and in what contexts? The answer and basis of the Crossing Minds business model is a sophisticated algorithm that can do precisely that. Following a Bertelsmann Investments workshop on artificial intelligence and machine learning in New York last fall, Penguin Random House is currently testing Crossing Minds' recommendation tool in a pilot project.

Sophisticated algorithms

Another result of the same New York workshop is the collaboration between BMG and Chartmetric, a Silicon Valley startup that specializes in the analysis of media data and primarily uses machine learning for this purpose. In the BMG pilot, which is also ongoing at the moment, the Chartmetric application investigates the use of music in various music streaming and social media platforms, in real-time. Playlists, individual songs, charts, and artists are included in the analysis in order to gain even deeper insights into consumer behavior. In a second step, BMG can link this real-time data with its own existing analyses, such as sales figures.

The German startup Multicast Media (MCM) is dedicated to a "pain point" that particularly pains the producers of audio and video content. Audio and video are not easy to find on the text-centric internet, and the associated analysis is complicated. MCM's solution, which uses artificial intelligence to transform language/voice into text, provides a way to work around this problem. A pilot now underway at UFA focuses on two aspects: the effective internationalization of UFA's daily series content, and the capture of metadata such as timestamped texts, semantic details, faces, voices, and objects for smart archiving. It is hoped that this data can be used to support new offerings and business models going forward.

Bertelsmann Investments doesn't just arrange collaborations with startups – the division also cultivates relationships with established tech companies with high relevance across the Group's divisions. Companies like the Chinese company Bytedance, which claims to be a leading operator of artificial intelligence, and is the umbrella company of brands including TikTok, Vigo Video, TopBuzz, and NewsRepublic. The BMG country label BBR Group has already collaborated with Bytedance's video platform TikTok in real life.

The case in question was a viral dance challenge, #TheGitUpChallenge, for BMG star Blanco Brown, who made it to the top of the U.S. Billboard charts with his debut hit “The Git Up.”

Credit rating in India, the simplification of production processes in China, sports streaming in the U.S., and online medical training in Brazil – all these businesses would be inconceivable without data and technology, sophisticated algorithms, artificial intelligence, and machine learning. “Bertelsmann actively supports startups in successfully building their business with the help of capital and expertise,” says Shobhna Mohn. “This gives us insights into current technical developments and the resulting solutions, as well as an intensive exchange with innovative entrepreneurs. Such partnerships are of great importance in this very dynamic time of rapid technical development.” ■

→ www.bertelsmann-investments.com

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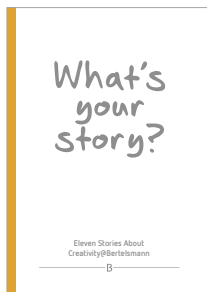
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If you are interested in one of the books mentioned here and would like to order a copy in German or in English, please send an email to benet@bertelsmann.de.



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