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Sample Pages

Digital Competence and Future Skills

Philipp Ramin

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Foreword

Why are we really concerned with digital competence? A question that you, as valued readers, have probably already answered before buying this book, right? But it's also a question I have asked myself repeatedly in recent years - even though I'm now the editor of a handbook on digital literacy and have trained with my company over 200,000 employees in companies all over the world in digital competence and future skills.

How does this fit together? My original, professional background is primarily in innovation and technology management, and in my earlier professional positions I dealt more with business model innovation, digital technologies and consulting approaches than with future talent development and competence management.

To understand the motivation behind this handbook, you equally need to know the development of the "Innovation Center for Industry 4.0", which I founded in January 2015 together with my partner Helmut Kraft near Regensburg in Germany.

Driven by enthusiasm for the vision of "Industry 4.0," which was first presented by Chancellor Angela Merkel at the Hanover Fair a few years earlier, we wanted to explain to the world the opportunities and potential of digital transformation in industry. We felt that a great new era was beginning, one that would bring many opportunities for companies and people.

Over several months, we traveled through parts of Europe and Asia to first understand for ourselves how far Industrie 4.0 and the digital transformation had come, and which concepts and ideas really worked in practice. All these insights were ultimately the basis for our modularized training program, named Digitalization and Industry 4.0 Driver's License, which also led to the founding of our company.

It was quite unusual to found a startup with a training program in a year when Apple introduced its first smartwatch and Gartner predicted 3D printing, Internet of Everything and various cloud services, among others, as the most important trends of the year. Founding a startup then, as now, meant first and foremost developing technology.

Over the years, the original idea of training employees and managers in companies for Industry 4.0 and getting them excited about it has developed into a significantly different task for my team and myself. After the first training sessions in Singapore at the beginning of 2015, I realized that it is not so much a matter of explaining certain technologies, but rather of enabling people to make the right decisions for themselves within the context of today's VUCA world (Velocity, Uncertainty, Complexity, Ambiguity). To achieve this, people must be empowered to deal with multidimensional requirements on their own. A goal that sounds very simple in theory, but in practice meant much more than we could imagine at the time.

In order to achieve this ambitious goal, however, it was necessary for me personally to get an even deeper understanding of the conditions and realities in the companies today. One particular reality that I have repeated observed in recent years and today is a perception gap. On the one hand, there were and are still the large conferences, trade fairs and workshops of associations and institutions with high-profile speakers, use cases and plenty of "digitalization confetti." These events often felt and still feel very much like family reunions. Why? Because, irrespective of where you are, you usually meet a very similar group of people everywhere who are intensively engaged with the digital future. One could almost speak of a kind of digital elite. Unfortunately, these well-intentioned scenarios often do not correspond to the reality in companies. In concrete terms, far fewer and significantly less significant projects have been implemented, as quite a few studies have repeatedly revealed in recent years. In addition, far too few people in the companies and even less in wider society really take sufficient note of the initiatives and projects. It is a case of the ivory tower we are all familiar with. To make matters worse, the leading global industry and the financial sector have an almost historically grown relationship with large consulting firms, which has meant that many digital projects are driven primarily externally as an extended workbench. In many cases, this prevents broad digital participation across different disciplines and groups of people, let alone the democratization of digitalization.

Back to my initial question about why I am concerned with digital competence. If we drill down into the almost hackneyed-sounding terms behind digital transformation, we can identify many issues and topics that need to be understood in a much broader context. This context is far broader than a purely technical business perspective. Rather, digitalization as a new dimension of innovation has sparked an economic, societal, and even social discourse that needs to be understood in all of its diverse shades – and that even outside the ivory tower. Let's take the principle of networking as an example. It is in no way a new development, but rather a deeply rooted human need to bridge barriers and cliffs and to connect things and people. This also applies in a special way to companies, which have always developed from relationships between different stakeholders. The creation of guilds or the organization of the Hanseatic League are good historical example here. The possibilities for networking have technically increased many times over, which must be understood - and not just for a small, exclusive minority. The exciting question, however, lies not only in the nature of networking, but also in the consequences that will result for people, societies and entire economic systems. Far too often, our answers to the question of "why" are too superficial. Are we just chasing a trend or do we really want to understand what it is all about?

A second example: the saying that "knowledge is power" was not only established in the course of digitalization, but was already articulated in the 17th century by Sir Francis Bacon. Today, we could paraphrase this statement in simplified terms as the "Big Data phenomenon ", which seems to be further intensified by exponential data volumes. If we assume that knowledge is power today - even more than ever, then we need to look more intensively at how digital issues are changing our lives and also at what role humans are playing in this. The much-invoked "thinking outside the box" is required, not only in theory, but quite intuitively for each of us. For me, this is also an intrinsic part digital competence and therefore a decisive factor for our common future.

Admittedly, the contexts described are somewhat simplified, but they underscore an interesting paradox: On the one hand, our world is changing quite massively, while on the other hand certain human, social and entrepreneurial issues remain quite unchanged.

Understanding the interrelationships of our time holistically and multidimensionally is precisely what digital competence means to me, or at least its starting point. Digital (r)evolution takes place not only in smart devices and algorithms, but above all in understanding the "new" world and thus in learning and education, at the most diverse levels. Only when a broad base succeeds in jointly penetrating the potentials will we also be able to solve the challenges of our time, be it a pandemic, social discord or sustainability. Digital competence must therefore leave the "ivory tower" and become accessible to everyone.

Therefore, at its core, it's not about digitization at all, that's just a means to an end, instead it's about something like the wisdom of how we as humans deal with the challenges of our time. For me personally, this realization is the reason why I consider this topic to be so central to our social and economic development. This realization is the reason why this book project came into being.

This book is intended to provide you with inspiration and concrete ideas on how different companies, institutions and industries are trying to operationalize "digital competence" for themselves. The book does not follow a single paradigm or school, instead it is a synthesis of different perspectives. Therefore, use the book as a toolbox to make your own sphere of influence - on a "small" or "large" scale - fit for the future. The individual contributions take different perspectives, but are united by the fact that this book features those experts who are actually doing something, who are taking responsibility, and who are thus helping to shape the (digital) future and are now sharing these experiences and their use cases with you. The following pages are thus also intended to be a stage for those who are already doing great things today and who simply do things full of optimism.

This book does not claim to be exhaustive; rather, it aims primarily at the multidimensionality of the topic. Accordingly, you will find heterogeneous starting points on what digital competence can mean, which organizational, cultural and strategic changes are needed and how people in organizations can develop in the future. To this end, the book also includes very concrete practical reports on how companies have designed their competence frameworks, developed training curricula, or implemented concrete e-learning and blended learning concepts, for example.

This book can also be understood as an invitation to continue the discourse on digital competence and the future of learning and development. If you, as readers, have ideas, experiences and suggestions on the topic, please feel free to contact us - the book project is far from over with the publication of this work.

Finally, I would like to conclude with a big thank you to all the people involved in this project. To realize a book of such scope requires a strong team. First and foremost, this includes the authors who have agreed to invest their valuable time in this project in order to provide a unique view into the most diverse shades and implementations of digital competence development in practice and science. But it also needs an innovative publisher, who has the courage to devote so much space to this important topic, which is why I would like to sincerely thank Michael Justus and Volker Herzberg from the Hanser Verlag. And last, but definitely not least, this book could not have been

realized without the dedicated team of future skills enthusiasts at our company, i40.de. I would especially like to thank our project manager Anne Koark, who organized this book full of sensitivity, passion and hundreds of emails. I would also like to thank my colleagues Daniela Wischinski, Daria Kutepowa and Martin Dowling for their support.

Yours

Philipp Ramin

May 2022

All authors are committed to the equal treatment of all genders. For ease of reading, the masculine form may have been used in places. This is in no way intended to imply that only men are meant. Digitalization needs diversity!

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About the Publishing Editor

Dr. Philipp Ramin is a leading expert on digital transformation and future skills. With his company the Innovation Center for Industry 4.0 in Regensburg, Germany, which he founded whilst completing his Ph. D. on the topic of discontinuous innovation and digital business models, he trains more than 200,000 employees in nine languages for leading companies from a wide range of industrial, business and financial sectors in more than 14 countries worldwide and has prepared a number of internationally recognized studies, for example on digitalization, artificial intelligence, digital competence. The Innovation Center for Industry 4.0 team, which was also instrumental in realizing this book, develops individual qualification solutions in the area of digitalization and Industry 4.0 for leading companies worldwide, including complete continuing education curricula and learning strategies as well as AR/VR solutions or complete digital online learning systems and competence management programs.

In 2022, together with one of his clients in the automotive sector, Philipp Ramin's company was awarded the recognized eLearning Award for Instructional Design by Germany's leading publisher in this field, elearning Journal for a state-of-the art digital competence upskilling program with high acceptance, artificial intelligence supported gamification elements and proven and measured acceleration of the transformation process.

Together with his multi-disciplinary international team of digitalization, technology and learning specialists, Philipp and his company have been awarded a grant from the EpicMegaGrant program in the US to develop a business learning platform for Unreal Engine. Philipp's company was also among the advisers and content deliverers for the VHS App Stadt | Land | Datenfluss, which found the patronage of the former German Chancellor Angela Merkel under the slogans, Digital Literacy for Everyone and Digital Education for Everyone.

In addition to being the CEO of the Innovation Center for Industry 4.0, since 2014 Philipp Ramin is also the deputy managing director of the renowned Münchner Kreis, an association that acts as an independent, interdisciplinary and international platform for key players from business, science and industry on the political and social challenges of digital transformation. In this context, Philipp was also co-responsible project leader of the Future Study VIII "AI in the Context of Life, Work, Education 2035+", published in June 2020. Next to his work in practice, Philipp is also a regular guest lecturer on the economic, technical and social consequences of digitization at several international universities, including Tallinn, Vilnius, Kuala-Lumpur, Amberg-Weiden and Regensburg. He is also the author of numerous technical and practical articles on various digital topics and has published these in renowned publications such as ATD Magazine, Computerwoche, CIO magazine and the recognized HR magazine Personalführung.

In October 2021, Philipp Ramin was appointed as a member of the Supervisory Board of Barth-Haas, the world's leading hop merchant based in Nuremberg and as Academic Counselor for the Fachwirt in Digitalization at the Frankfurt School of Finance and Management.

Through his voluntary political commitment, Philipp Ramin was elected as one of the youngest city councilors in Bavaria back in 2008. In the meantime, he has become the chairman of the parliamentary group and third mayor in his hometown of Neutraubling, where he is particularly committed to the digitalization of the citizen administration.

Philipp Ramin studied at the University of Regensburg and the American University, Washington D. C., with a focus on innovation and technology management, and earned his Ph. D. on the topic of discontinuous innovation and business models. Prior to his current activities, Philipp Ramin was an advisor in the German Bundestag and worked in both the automotive and consulting industries.

As the editing publisher of this book, Philipp has brought together a bouquet of more than 50 expert authors from leading companies and from state-of-the-art scientific research on digital competence development and future skills, to share with the readers their use cases, experience, recommendations and current research results in and around the task of making companies and their employees fit for the future.

Be part of the
digital competence
revolution.

Author Directory

Andrea Alboni

A world where people work with robots, not like them – that is his vision for the future. As General Manager Western Europe at Universal Robots, Alboni is already actively working to make this a reality. His mission: to support small and medium-sized enterprises in overcoming challenges such as labor shortages and cost pressures. And to show them how easily they can take the step towards automated production with collaborative robots, the cobots.

The native Italian looks back on ten years of sales experience. Before joining Universal Robots, he held senior sales positions at Webasto Thermo & Comfort and the power technology manufacturer SFC Energy. An economist by training, he graduated from the Università degli Studi di Modena e Reggio Emilia (Italy).

Joining Universal Robots in 2019 as Channel Developer, he quickly made a convincing impression, becoming Regional Sales Manager and finally, in December 2020, General Manager for the Western Europe region, one of the most important sales markets of the cobot pioneer. With passion and technical know-how, Alboni has since been committed to the development and use of collaborative robotics.

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Silvio Andrae

As a project manager, business coach, and lecturer, he is convinced that digital competence requires a more holistic and broad-based understanding. In addition to the relevance and significance of technical knowledge and skills, socio-cultural issues of the implications and effects of digital technologies on individuals and society play a role. This point is valid regardless of the industry. Beyond that, Silvio Andrae has gained most of his professional experience in the financial sector. He is particularly interested in redesigning and further developing business models in the financial industry. Currently, he works as a regulatory expert at the German Savings Banks Association. Silvio Andrae studied and received his Ph. D. at the Free University Berlin.

Company: German Savings Banks Association
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Prof. Dr. Daniel Beimborn

is the Chair of Information Systems Management at the University of Bamberg. Previously, he was professor at the Frankfurt School of Finance & Management from 2014 to 2018. Prof. Beimborn graduated and received his PhD from Goethe University in Frankfurt am Main and was a visiting researcher at Microsoft in Redmond, Georgia State University, Louisiana State University, and the MIT. His research activities include organizational success factors of digital innovation and transformation, management of IT outsourcing relationships, IT governance, and business/IT alignment. He has published numerous articles in highly reputed scientific journals (such as MIS Quarterly, Journal of Management Information Systems, Journal of IT) and is a member of the editorial boards of several international journals. Prof. Beimborn teaches courses on Digital Innovation, Digital Transformation, and IT Outsourcing in Bachelor, Master, and executive programs in Bamberg and at various European business schools. He has led the introduction of study programs on International Information Systems Management and Digital Business and he is a trusted lecturer of the Bavarian Elite Academy.

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Felicitas Birkner

Under the motto: "Developing potentials and personalities," Felicitas Birkner has led many business projects to success in almost 30 years of professional experience. After her studies (TU Dresden), she worked in international IT companies in various roles and responsibilities and has extensive expertise in finance & sales, marketing & communications, business management, HR & education. Today, she heads the Fujitsu Academy (Central Europe) and, as a member of the Bitkom e. V., she leads the Women in the Digital Economy committee. She is an Advisory Board Member of the Asian European Society at TUM and a board member of the German alliance initiative Shetransforms*IT*.

As a coach, speaker and trainer, she is a strong advocate for education and equal opportunities in society, works as a member of the corporate advisory board of the BIBB research project FeMINT, has supported change processes in digital transformation, diversity & inclusion initiatives and has been accompanying career paths as a mentor for many years. Felicitas developed the P.e.P.Lifestyle Program® (2009) and founded (2012) the PWN-Munich e. V., which today belongs to the Professional Women Network global. As an author, she motivates, among others, in "Visionäre von heute – Gestalter von morgen" (2018) or "CSR-Digitalization" (2017 & 2021) or "Bauchgefühl im Management" (2021) ed. by Springer-Gabler Verlag, and "Handbuch Digitale Kompetenzentwicklung" (2021, Hanser Verlag). In 2019, she was awarded the "Women of the Year 2019" by the "Women in IT Award Europe" and received the "Female in IT 2019 Award" in the category Digital Transformation in Germany. Felicitas is a mother (3 children) of a patchwork family, brings different experiences of everyday life of family and work and is convinced that the conscious use of resources, diversity, togetherness and networking are key success factors in digital transformation.

Company: Fujitsu

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is a researcher and doctoral student at the Chair of Behavioral Economics at the Mercator School of Management of the University of Duisburg-Essen. His research focuses on the application of behavioral interventions, i.e., nudges, to optimize business decisions. Furthermore, he conducts experimental research in the area of unethical behavior and information processing. Before his scientific career, Kim started his professional career with an apprenticeship as an industrial clerk at an energy supply company and a part-time study of Business Administration (B.A.) at the RFH – University of Applied Science (Cologne, Germany). He continued his studies in Business Administration (M.Sc.) with a focus on business informatics, performance management and leadership as well as economic policy at the University of Duisburg-Essen. Kim worked in sales development and later in innovation management at rhenag – Rheinische Energie AG (formerly RWE/innogy group, now E.ON group). At the University of Duisburg-Essen, Kim teaches in behavioral economics, econometrics as well as macroeconomics. He has lectured at the University of Borås (Sweden), at the Radboud University (Nijmegen, Netherlands), and at the RFH – University of Applied Science (Cologne, Germany).

UNIVERSITÄT
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E S S E N

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Sebastian Borchers

is convinced that data-based analysis and holistic concepts with concrete offers are the keys to the success of transformation processes.

He studied business administration in Ingolstadt and London and began working in Human Relations in 2004 for international companies in the mechanical engineering and automotive industries. There, he oversaw operational personnel management as well as changes in new collective agreements, restructuring and HR process design.

Since 2015, he has been involved in agile work methods and project management in the Group HR Strategy of Continental AG. In addition, he was a member of the Works Council at Continental's Corporate Headquarters for more than 5 years.

In 2018, he became program manager of "Continental in Motion!", a program focusing on internal labor market and qualification for Continental employees in Germany. Since 2019, he has headed the newly established Continental Institute of Technology and Transformation (CITT). With an internal academy, the institute is the HR competence center for shaping and accompanying transformation at Continental. In 2021, he took over the additional role of Head of Talent Management and Organizational Development (TMOD) Germany.

Company: Continental AG

Position: Head of Talent Management & Organizational Development Germany; Head of Continental Institute of Technology and Transformation (CITT)

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Daniel Breitinger

is consultant in the Public Affairs team of Bitkom, Europe's largest digital association. Founded 1999 in Berlin, Bitkom represents more than 2,000 companies of the digital economy. The membership spans more than 1,000 SMEs, over 500 startups and virtually all global players.

At Bitkom, Daniel is responsible for education policy issues such as the teaching of digital skills and the impact of digitalization on apprenticeships, higher education and continuing vocational training.

He also deals with issues such as how we can address the shortage of IT specialists and how we can strengthen women in the digital industry. Daniel successfully initiated and accompanied pivotal studies and reports on digital education in Germany and put together a series of requirements for change for German politics.

He studied European Studies and Political Science in Passau, Pavia and Berlin. During his studies, Daniel worked in the office of Member of the German Bundestag, was an Intern at the Consulate General of the Federal Republic of Germany in Sydney, Australia, and worked at the Representation of the Free State of Bavaria to the Czech Republic in Prague. Daniel worked for number of private sector companies including Volkswagen Group in Berlin and Brussels before joining Bitkom in March 2021. Furthermore, he is the director of the Young European Federalists Berlin-Brandenburg e. V., a pro-European youth association.

Company: Bitkom e. V.

Position: Education Policy & Public Affairs Officer

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Prof. Dr. Michael Dowling

was appointed to the Chair of Innovation and Technology Management at the University of Regensburg in 1996.

Prof. Dowling was born in New York, USA, in 1958. He studied at the University of Texas at Austin (Bachelor of Arts with High Honors), Harvard University (Master of Science) and University of Texas at Austin (Doctor of Philosophy in Business Administration). He also worked as a Research Scholar at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, and as a Research Analyst at McKinsey & Company in Dusseldorf, Germany.

After receiving his Ph.D., Dowling was an Assistant Professor at the University of Georgia, USA, and was promoted to Associate Professor with tenure in 1995. In the summer semester of 1990, he was a visiting researcher at the Institute of Organization at Ludwig-Maximilian University in Munich with Prof. Dr. Eberhard Witte and in the summer semester of 1994 at the University of Erlangen-Nuremberg at the Chair of Corporate Management with Prof. Dr. Horst Steinmann.

Since 2014, Prof. Dowling has served as the Chairman of the Board of MÜNCHNER KREIS e.V. the leading independent platform providing orientation for decision-makers dealing with digital transformation.

www.muenchner-kreis.de

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Martin Dowling

is the General Manager at MBN GmbH – a company which is part of the PROLED Group. The PROLED Group is responsible for the development and production of lighting solutions for clients all over Europe. In his role as Chief Operations Officer and Chief Finance Office, Martin is in charge of the coordination of daily operations as well as developing groupwide strategies to improve all aspects of operations. Prior to his current position, Martin was the Chief Operations Officer of the international training, consulting and research company German Innovation Center for Industry 4.0 and an expert in digital competence development for businesses. As the former head of the Digital Skills Development team, Martin developed multifaceted solutions for data-driven learning architectures with the aim of identifying the right groups of employees and supporting them with the best combinations of learning content and learning method at the right time. In parallel to his day-to-day business, Martin is a former member of the renowned MÜNCHNER KREIS e.V., an association that acts as an independent, interdisciplinary, and international platform for key stakeholders from business and academia on the political and social challenges of digital transformation. Martin completed a double Master of Science in Psychology (focus: business psychology, leadership, quantitative analysis) at the University of Regensburg and in Organizational Communication at Murray State University, Kentucky, USA. Furthermore, he graduated from the Quantic School of Business and Technology, thus rounding off his education with a Master of Business Administration (MBA). After a short period as a lecturer in Public Speaking in the USA, Martin spent some time at the HR consultancy Mercer | Promerit. During his time as an HR consultant, Martin participated in projects ranging from HR process optimization, to overall HR transformation, to implementation of Mercer grading structures, to harmonization of HR policies.

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Kathrin Droste

joined Volksbank Mittweida eG in 1996 when she started her career as a trainee banker. In 1999, she became head of department for various areas, allowing her to build her expertise in distribution support, business organisation, compliance, marketing and HR, among others. Kathrin Droste has been the head of the organisation development/HR department since 2007. Along with the strategic and procedural development of the HR department, she also advises the bank's management team, initiates corporate culture and personnel development projects and assists with the bank's digital transformation. At present, Kathrin Droste is responsible for the entire sustainability initiative along with supporting the introduction of agile work methods and actively working towards developing the management culture.

Company: Volksbank Mittweida eG
Position: Head of the Organisation Development/HR Department

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Steffen Fischer

is CHRO for the international automation company ifm group services gmbh and Executive Board Member of the ifm group. Before this, he was HR manager for the engine manufacturer MTU Maintenance Berlin-Brandenburg GmbH. Steffen Fischer deals with holistic approaches of HR management in all their facets and is co-author of the BPM brochures "The personnel strategy in a nutshell" and "The personnel strategist in concrete terms" as well as in 2019 "Between euphoria and skepticism – AI in HR work". In 2014 he was appointed manager of the strategic HR management group of Bundesverband der Personalmanager e. V. (Federal Association of Personnel Managers) and in 2015 Business Ambassador Singapore for German small and medium sized enterprises.

Company: ifm group services gmbh; German Association of Personnel Managers e. V. Berlin (BPM)
Position: CHRO ifm group services gmbh & Executive Board Member; Head of the Strategic Personnel Management Specialist Group at the German Association of Personnel Managers e. V. Berlin (BPM)

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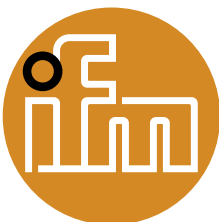
Wirt.-Ing. Roman Gaida, MBA

(39, and a father of twins) is Head of EMEA at Mitsubishi Electric CNC Europe B.V. Former Machine Tool Operator now Tech Leader in a "Fortune 500" company with over 23 years of professional experience combined with entrepreneurial thinking and a strong ability for customer needs, leadership and cultural change. Before starting in this position in April 2018, Roman was Head of Sales & Marketing Europe and was responsible for all of the division's European sales and marketing activities, including the Middle East and South Africa. Prior to joining Mitsubishi Electric, Roman was Global Business Development and Segment Manager for Oerlikon and was responsible for all business development activities of the Nitriding Business of Precision Component worldwide. Roman earned an MBA from RWTH Aachen and St. Gallen University, and a Bachelor of Engineering degree in Industrial Engineering. He is an experienced leader in post-merger and change management processes on a global scale. Identify, develop and hiring talents is one of his key skills. He is keynote speaker and author (Campus Verlag) but also a frequent guest in podcasts and magazines (e.g Xing New Work Stories Podcast, Harvard Business Manager Magazine, Digikompetenz Podcast) for the topics leadership, digital & cultural transformation and how to combine family and career.

Company: Mitsubishi Electric Europe B.V.

Position: Head of Division EMEA

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Dr. Wolfgang Gallenberger

studied educational sciences (diploma) at the University of Regensburg, where he did his ph.D. on the participation of elder employees in continuing education.

As a research assistant at the University of Regensburg, he received the Bavarian State Government's prize for excellent teaching and worked on the use of learning platforms to support university teaching. In July 2002, he went to the Institute for Work and Health of the German Social Accident Insurance in Dresden. There, too, he combined his educational practical and theoretical ambitions. He trained trainers, conducted research on the effects of preventive training measures in occupational health and safety, and was one of the founders of an audit system for quality management for training work in German Social Accident Insurance that is still in use today.

At the end of 2007, he moved to the software company Capgemini sd&m. As Head of Learning and Development, he systematized personnel development for the employees of the Capgemini Group's Technology Services in DACH. A global restructuring of human resources at Capgemini prompted him to put his dream of self-employment as an executive trainer and coach into practice starting in 2011.

He advised various larger and medium-sized companies, but then received a call to an interdisciplinary teaching project at Coburg University of Applied Sciences as a temporary professor in mid-2012. From mid-2016, he was responsible for technical continuing education at the IHK Academy in East Bavaria and, also responsible for the business and technical courses at the Regensburg study center of the Hamburger Fern-Hochschule (Hamburg long-distance university), University of Applied Sciences (HFH). In both roles, he promoted the use of virtual elements in continuing vocational education and extra-occupational distance learning. Pilot projects on the use of learning platforms and virtual classrooms were the order of the day.

Dr. Gallenberger moved to Maschinenfabrik Reinhausen in September 2019. As part of the HR Expertise Center, he works there on the workforce transformation of a company steeped in tradition with a (digital) future.

Company: Maschinenfabrik Reinhausen
Position: HR Expertise Center

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Caroline Heide

is a future-forward thinker who is not afraid to challenge the status quo. She is graduated from the Technical University Berlin in Industrial & Network Economics. She is a keynote speaker for digital topics, has an open, ethical mindset, and loves change. She has been working at Coca-Cola European Partners for 6 years. Having started off as a working student, she quickly realized: the working world is not ready for the future yet. That's why she started in a special innovation role and drives the topics of Artificial Intelligence and Robotic Process Automation for the People & Culture area. As P&C Digital Innovation Lead she is leading a team of smart people focused on disruptive innovations within People & Culture. She knows: It is impossible to reach any level of success if you don't allow yourself to fail. That's why she is constantly pushing to talk about failures in all her digital projects and teams. She also focusing on all kinds of tech and trend-related topics and how the future might look from a technical and ethical standpoint. Additionally, she started a blog, www.changeover.blog, to inspire others to be brave and think about technology ethically.

Company: Coca-Cola Europacific Partners
Position: P&C Digital Innovation Lead

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Ann-Kathrin Heinemann-Becker

"Giving people freedom with accountability" is what Ann-Kathrin stands for and what she deeply believes in for a company to flourish innovational power. As VP People she is leading the Global People Strategy and ensuring that the right structure, processes and culture is in place to attract, retain and grow people. It is the Swedish culture that inspires Ann-Kathrin and kept her in the Atlas Copco Group for more than 14 years. It is the mindset that people will take own responsibility if we trust them to do so. It is about learning and trying out new things. It is about modesty and flat hierarchies, inviting everybody to the table. This is why Diversity and Inclusion matters a lot to her and she sponsors a global network. Having gained wide and global experiences in different Divisions, she is fascinated by the power of culture and why people can make a difference – seeing it specifically through the eyes of a post-merger integration. She holds a master's degree in International Management from University Erlangen-Nuremberg and has worked and studied in Italy. She is certified Systemic Coach and Change Manager and has a passion for supporting start-up companies.

Company: Atlas Copco Group AB, Atlas Copco Vacuum Technique Business Area
Position: Vice President People & Culture Vacuum Technique Service Division

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Yannick Hildebrandt

is a PhD student at the Information Systems Management Group at the Otto-Friedrich-University of Bamberg. He completed a combinatorial study of media informatics and information science in Regensburg (B. A.), which was followed by the M. Sc. degree in business informatics at the University of Bamberg. During his time at the University of Skövde in Sweden, he focused on data analytics and data science methods. Yannick already has experience in industry through various activities, as well as in VR/AR and EdTech start-ups for digitalization and Industry 4.0. His research focuses on the human and organizational factors of digital innovations and digital transformations, especially in industry. In his opinion, the "technological gap" between "digital natives" and "digital immigrants" is the biggest challenge for successful digital innovations and digital transformation.

Institution: University of Bamberg
Position: PhD student at the Information Systems Group

LinkedIn: *linkedin.com/in/yannick-hildebrandt-841933152*

Dr. Jürgen Hollatz

studied computer science with a subsidiary in theoretical medicine at the Technical University of Munich. In 1992, he completed his doctorate at the TU Munich on learning in artificial neural networks. He then joined Siemens in the central research and development department and became head of the Fuzzy Systems Research group. Many of his international publications and papers date from this time.

In 1998, Jürgen Hollatz moved into education at the Siemens Technik Akademie in Munich. In 1999, he founded the Technik Akademie at Siemens in Düsseldorf, a state-recognized vocational college that continues to operate successfully today as the Berufskolleg für Informations-, Kommunikations- und Automatisierungstechnik.

Since 2006, he has been responsible for the training centers of Siemens AG, first in northern Bavaria and now at all training locations in Bavaria. From 2012 to 2017, he was Chairman of the Board of the Siemens Technik Akademie Foundation.

Jürgen Hollatz is involved in many areas of education, such as the work of the Schule-Wirtschaft network (School-Business-Network), in various vocational training committees at the Chamber of Commerce & Industry (IHK) and in the Association of German Chambers of Commerce & Industry (DIHK), and as a member of the board of trustees of the Nuremberg Technical University of Applied Sciences.

Company: Siemens AG

Position: Head of Siemens Professional Education Germany – Region South

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Sebastian Kiefer

completed a dual bachelor's degree in business informatics in cooperation with the company Siemens AG in 2014 and completed a master's degree in business informatics at the University of Bamberg in 2016. Until 2018 he was employed as IT Lead and Rollout Manager at the company Siemens AG. Since 2019, he is an external doctoral researcher at the Chair of Cognitive Systems with Professor Dr. rer. nat. Ute Schmid. He conducts research in the areas of artificial intelligence, machine learning, and human computer interaction in collaboration with the company DATEV eG, where he also takes on tasks of a Data Scientist. His focus is interpretable and human-level machine learning and the generation of contextual explanations for classifiers.

Company: DATEV eG, University of Bamberg

Position: Data Scientist, External Doctoral Researcher

Twitter: *www.twitter.com/uniwiai*

Beate M. Kreiner, MSc, MBA

As founder and managing director of BOLD Enterprise Business-, Organizational- & Leadership Development GmbH, Beate M. Kreiner is convinced that you can only understand life backwards, but you have to live it forwards. She studied part-time and earned her Master of Business Administration and Master of Science degrees in 2007 and 2017, respectively.

Beate M. Kreiner's professional career began in the late 1980s in a law firm. She then moved into healthcare for over a decade and successfully established a business school from 2009 to 2019, where she was also responsible for the organizational leadership of numerous academic programs. She rounded out her freelance career focusing on human resource management, project management, and change management by founding a company in 2019. As an entrepreneur, coach and consultant, she supports and accompanies management projects with passion and courage, in which clients – who benefit from her many years of cross-sector experience and expertise – are seen as partners.

Company: BOLD Enterprise Business-, Organizational- & Leadership Development GmbH
Position: Founder and CEO

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LinkedIn: *https://www.linkedin.com/company/bold-enterprise-business-organizational-leadership-development-gmbh/*
Xing: *https://www.xing.com/profile/BeateMaria_KreinerMScMBA/cv*

Sven Krüger

Preparing and imparting technical knowledge – that is his passion. Because Sven Krüger knows that education – especially in the field of robotics – is crucial for people to be able to work in a healthy, efficient and future-oriented way. As a Global Master Trainer at Universal Robots, he was therefore instrumental in bringing the UR Education concept to life in 2020. For the first time, this concept provides teachers with helpful materials to offer hands-on automation lessons and thus prepare their students for the working world of tomorrow.

Robots have fascinated Krüger since his training as an electronics technician for industrial engineering at the medical technology manufacturer Sarstedt AG & Co, where he worked in the maintenance department after graduating. From 2014, he completed the trainer aptitude test and further training as a state-certified technician in electrical engineering at the Rheinische Akademie in Cologne.

With the intention to combine education and robotics, Krüger then started as a "Technical Support" employee at Universal Robots in 2016 and soon provided dedicated support in setting up the UR Academy, designing and delivering courses. Today, he is a Global Master Trainer and is dedicated to making robotics know-how accessible and tangible for everyone.
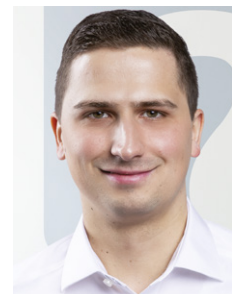
Company: Universal Robots (Germany) GmbH
Position: Global Master Trainer, Industry Program

LinkedIn: *www.linkedin.com/in/sven-krüger-78a3b1b3*

Angela Luft

After graduating as an Industrial Engineer with a focus on production management and various stations abroad, she worked for a total of three years at MTU Friedrichshafen in the Global Operations Footprint as well as the license department. During this time, she supported and implemented projects for operations and technical license management in Germany, South Africa, the USA and various other countries. Subsequently, she worked as a consultant in the field of production optimization and project management in the automotive industry. She is currently writing a PhD in the field of additive manufacturing technologies in the context of production systems at the FH Aachen University of Applied Sciences in cooperation with the University of Cluj-Napoca. As a transformation coach, she encourages people and companies to step into conscious leadership.

Institution: FH Aachen University of Applied Sciences
Position: Business Coach and Consultant, PhD candidate

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Prof. Dr.-Ing. Nils Luft

is Professor for Intralogistics in Manufacturing Companies at the Department of Mechanical Engineering and Mechatronics at FH Aachen University of Applied Sciences. He teaches and conducts research in the areas of factory planning, Intralogistics and operations management as well as Industry 4.0. After studying logistics at TU Dortmund University, he completed his doctorate in the field of mechanical engineering on the subject of flexibilization of production systems. Following his doctorate, he founded a software company for factory planning and production management as managing partner together with colleagues as part of the EXIST start-up grant. Since 2016, he has been appointed as a professor at FH Aachen University of Applied Sciences. He is chairman of the VDI Expert Committee for Factory Planning, and a trainer for the Innovation Center for Industry 4.0 in Regensburg. He advises companies and entrepreneurs on the topics of Industry 4.0, digitalization and factory planning.

Institution: FH Aachen University of Applied Sciences
Position: Professor Intralogistics in Manufacturing Companies

LinkedIn: *www.linkedin.com/in/dr-nils-luft-91788785/*

Dr. Lutz Marten

has been with IBM for over 20 years. In his current responsibility, he leads teams of trainers and consultants in Europe and Middle East & Africa for the area of "Learning, Leadership Development, Diversity & Inclusion". In addition he supports Leadership and Management Development, designing and running interventions for the aspiring leader to senior executive population across IBM. Prior to joining IBM Corporate Learning, Lutz Marten spent ten years as a senior managing consultant with IBM Consulting in various solution and industry areas.

Lutz Marten acts as a mentor and coach inside IBM and as a tutor for students inside and outside of IBM. In addition, he is an active alumnus of RWTH Aachen University and involved in IBM's university relations.

His professional background from his positions before IBM, are characterized by consulting, project management, business development and leading formal and informal teams of different size and composition.

Dr. Lutz Marten studied Computer Science, Business Administration and Operations Research at RWTH Aachen University and received a PhD in Computer Science while working for the Fraunhofer Society at the Institute for Laser Technology in Aachen. He is a senior member of the ACM (Association for Computing Machinery) and a member of the GI e. V. (German Society for Computer Science)

Lutz Marten is married and lives in Würzburg, Germany.

Company: IBM Deutschland GmbH

Position: IBM Transformation & Culture Squad Leader Europe & MEA Learning & Leadership Development

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Twitter: *https://twitter.com/ISPF*

Dr. Elvire Meier–Comte

has been Vice President and Director of Human Resources for Operations at the European aerospace group Airbus Defence and Space since 2019. In this role, she is a member of the Board "Operations", currently responsible for over 10,000 employees and leads from the HR and organization side the implementation of Industry 4.0 in production, quality and purchasing worldwide. In her previous position as VP, Head of Talent & Executive Management, she was responsible for the top 250 executives and talents worldwide. Her special focus was on designing and implementing innovative learning and network-oriented approaches to leverage the opportunities of digital transformation.

Prior to joining Airbus, she worked for 18 years at Siemens AG in various leadership positions, industries & functions in Europe, America and Asia. After holding positions in Group Strategy and Marketing & Sales, she spent ten years as a Senior Advisor to the Technology Central Board. There she worked on "disruptive" changes.

The so-called "smart innovations" using China and India as examples were an integral part of her area of expertise.

Dr. Meier-Comte is also an honorary steering committee member of the Deutsch-Französisches Zukunftswerk, an initiative of the German Federal Ministry for Research and Development for European transformation, and a member of the Transfer Council of the University of Hamburg.

She is French, studied at the Institut d'Etudes Poliques, Lyon and at the University of Salzburg, completed an MBA in Metz-Saarbrücken and holds a PhD in Innovation Management from the University of Potsdam.

Company: Airbus Defence & Space

Position: Vice President Head of HR, Airbus DS Operations

LinkedIn: *www.linkedin.com/in/elvire-meier-comte-dr-026b1b*

Annika Müller de Vries

took over as Head of Continuing Education at the Federal Bank of Germany (Deutsche Bundesbank – Frankfurt am Main) in April 2011 and, together with 28 employees, is responsible for the professional and interdisciplinary qualification of around 11,500 employees with highly diversified areas of responsibility in the Bundesbank's Central Office in Frankfurt, 9 Regional Offices and around 35 branch offices throughout Germany. The development of digital skills has become a central topic in this context. As a member of the Task Force on Training and Development of the European System of Central Banks (ESCB) and the Single Supervisory Mechanism (SSM), she is also closely networked with the training departments of other European central banks and Supervisory Authorities and is involved in shaping the system-wide training measures, which are increasingly also be carried out digitally. As a political scientist and historian (Technical University of Berlin/University of Edinburgh), she started her professional career at the Federal Bank of Germany (Bundesbank) in November 2000, initially in Executive Board Communications. In 2016/2017, the bank enabled her to work in the coordination team for the German G20 presidency. Not least because of her own vita, the author advocates positions of continuous professional reorientation and development.

Institution: Deutsche Bundesbank

Position: Bundesbank Principal, Head of Training Section, Directorate General Economic Education, University and International Central Bank Dialogue

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Dr. Rahild Neuburger

works at the research unit "Information, Organization and Management" in the cluster "Information Systems & Digital Business" at the LMU Munich School of Management. Since her doctorate, she has been involved in many book and research projects at the interface between digital technologies and business topics. Her research focuses on implications of digitalization/artificial intelligence on work and organizational structures as well as related issues of leadership, education/competency development, change management and work methodology. In addition, she is the General Manager of MÜNCHNER KREIS e. V. and coordinator of the working group "Work in the Digital World" here, a member of the board of the Charta Digitale Vernetzung (Charta Digital Networks), and the author of numerous publications on the topic of competencies.

Institution: LMU; MÜNCHNER KREIS e. V.

Position: Senior Lecturer at the LMU Munich and General Manager at MÜNCHNER KREIS

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Prof. Dr. habil Robert Neumann

holds a doctorate and post-doctorate in business administration with a focus on organizational, personnel and management development. Since then, he has taken on management functions on a temporary basis, consulting mandates, developed and led management development programs and is himself active internationally as a lecturer for leadership and change management topics. At the St. Gallen Business School, he has been active in academic leadership functions and as a trainer since 2008. In addition to his academic university career, he has successfully built up a business school over a period of 10 years and established himself as a provider of in-service leadership development in the form of university courses.

Currently, as founder and CEO of BOLD Enterprise Business-, Organizational- & Leadership Development GmbH, Robert Neumann concentrates as a speaker, trainer, coach, author and consultant on the topics that have accompanied him for more than 30 years – the design, management and implementation of learning, change and development processes of executives, high-performance teams and organizations to ensure sustainable success.

Company: BOLD Enterprise Business-, Organizational- & Leadership Development GmbH

Position: Founder and CEO

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Xing: *https://www.xing.com/profile/Robert_Neumann18/cv*

Christiane Nicolai

Christiane Nicolai is a Training Manager at AUDI AG for specialized After Sales Executives and Managers in the non-technical part of the Audi Partner Organization. Since decades, her research has been focused on finding optimal opportunities and conditions for individual learning, the design of self organized learning processes and learning arrangements. Due to her fascination and relevance of those concepts in times of digital change and transformation, a main emphasis of her work has been to implement her findings in digital and hybrid learning formats through digital learning design and gamification.

She studied pedagogy with a focus on adult education at the Justus-Liebig-University in Gießen, Germany and was involved in several scientific research projects of the Bund-Länder-Kommission on the topic of medial learning processes and professional competence development.

In 1998, she took these topics to AUDI AG. Here she worked in internal education and training for the group's employees and took over the development of an in-house e-learning team.

Since 2009, she has been developing digital learning designs and innovative learning media for self-organized learning processes, among other things, as one of her core areas in the Sales division.

Company: AUDI AG

Position: Qualification Specialist for Specialists and Executives of the Sales Organization in the area of Service, Digital Learning Designs and Gamification

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Barbara Ofstad

Dipl.-Betriebswirtin (FH), studied European Business Administration at ESB Reutlingen and at ESC Reims. She also holds an MBA, International Management from the Monterey Institute of International Studies (USA).

While Barbara Ofstad started her professional career after graduation in the SME sector, she has been working for Siemens AG for more than 20 years, passing through different business units in Germany and abroad in the functions of marketing, product management and SW development management. In 2015, she switched to Vocational Education and Training and, as Head of Siemens Professional Education Germany, has been responsible for technical and commercial training, dual study programs and upskilling/reskilling since 2017. She is currently deputy spokesperson of the VDMA Vocational Training Committee and spokesperson of the Vocational Training Committee of the Vereinigung hessischer Unternehmerverbände (VhU) e. V. (Association of Hessian Business Associations).

Barbara Ofstad is also a trustee at the Fraunhofer Institute for Business and Technomathematics (ITWM), Kaiserslautern.

Company: Siemens AG

Position: Head of Siemens Professional Education Germany

LinkedIn: *www.linkedin.com/in/barbofstad/*

Luise Ortloff

has been working since 2016 as a policy advisor and scientific consultant at acatech – the German Academy of Science and Engineering – in the field of economics, education and work. There, she is responsible for the topic of the future of work and, among other things, project manager of acatech's Human Resources Circle. She has held the position of Head of National Economy, Education and Labor since February 2022.

After completing her master's degree at Helmut Schmidt University/University of the Federal Armed Forces Hamburg in education and educational sciences, with a focus on counseling psychology and adult education, she was able to gain experience in personnel and project work as an officer and manager in the German Armed Forces.

From 2016, she studied Human Resource Management part-time at the FOM University of Economics & Management, where she graduated with a Master of Science degree in 2018. With her master's thesis on the topic of digitalization in the context of work, she was among the finalists for the best master's thesis in economics in 2019 in the "Supermaster" competition organized by WirtschaftsWoche magazine.

Institution: acatech – National Academy of Science and Engineering

Position: Head of National Economy, Education and Labor/Policy Advisor

LinkedIn: *https://www.linkedin.com/in/luise-ortloff-5b3515120/*

Dr. Herbert Prickarz

studied business and clinical psychology and earned his doctorate on psychological factors of successful change management as an employee of Robert Bosch GmbH at the University of Cologne. In 2006, he moved to hybrid vehicle development as a project manager for human-machine interaction. From 2009 onwards, he coordinated the international competence management network of Robert Bosch GmbH and led the associated global digitalization project.

From 2012, he took on various project and management tasks in HR and, together with his team, supported the GmbH in setting up the "Autonomous Driving" unit.

Since 2019, he has been driving the digital transformation in the organization together with the business units of the mobility sector of the Robert Bosch GmbH. The certified Project Management Professional (PMP)® and coach combines digitalization, human resources, cultural and organizational development to make the company fit for the future. As keynote speaker and lecturer at the Stuttgart University of Applied Sciences, he shares his experience and enjoys the lively exchange of ideas.

Company: Robert Bosch GmbH

Position: Business Chief Digital Office BBM

LinkedIn: *www.linkedin.com/in/herbert-prickarz*

Dr. Philipp Ramin

Innovationszentrum
für Industrie 4.0

is founder and CEO of the international future skills training and consulting company Innovation Center for Industry 4.0 in Regensburg, Germany, which runs international projects on future skills and digital transformation in 14 countries worldwide. Philipp Ramin developed the leading international e-learning and training program for Industry 4.0 and Digitalization, with a focus on systematic, continuous knowledge and competence building company-wide – with technical, strategic and cultural skills. The first international and independent online platform for Industry 4.0 was also initiated by Philipp in 2015. With his company, he was among the specialist advisors for the VHS App Stadt|Land|Datenfluss, the patron of which was German Chancellor Dr. Angela Merkel. In addition, Philipp is the author and editor of the Digital Competence and Future Skills - How companies prepare themselves for the digital future, published in German and English language by Hanser Verlag, with chapters from over 50 leading experts from companies, institutions & research on digital competence development. Since 2014 Dr. Ramin is the Deputy Managing Director of the renowned Münchner Kreis, an association that acts as an independent, interdisciplinary, and international platform for key players from business, science and industry on the political and social challenges of digital transformation. In this context, Dr. Ramin was also co-responsible project manager of the joint future study with Münchner Kreis and the Bertelsmann Foundation "AI in the context of life, work, education 2035+", published in June 2020. In October 2021, Philipp Ramin was appointed as a Member of the Supervisory board of BarthHaas and as Academic Counselor of the new accredited Business Administrator in Digitalization (Fachwirt in Digitalisierung) at the Frankfurt School of Finance and Management. He is also a regular guest lecturer on the economic, technical and social consequences of digitalization at several international universities, including Tallinn, Vilnius, Kuala-Lumpur, Amberg-Weiden and Regensburg and the author of numerous technical and practical articles on various digital topics. Philipp Ramin studied at the University of Regensburg and the American University, Washington D.C., with a focus on innovation and technology management and earned his Ph.D. on the topic of discontinuous innovation and business models. Originally one of the youngest town council members in Bavaria, Germany, Philipp is in the meantime the head of his party and a deputy major in his hometown of Neutraubling, where he places focus on the barrier-free digitization of citizen services. Prior to his current activities, Philipp Ramin was a consultant in the German Federal Parliament (Bundestag) and worked in both the automotive and consulting industries.

Company: Innovationszentrum für Industrie 4.0 GmbH & Co. KG (Innovation Center for Industry 4.0, *www.i40.de*)

Position: Founder and CEO

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Linkedin: *www.linkedin.com/company/innovationszentrum-f%C3%BCr-industrie-4.0-german-innovation-centre-for-industry-4.0*

Twitter: *www.twitter.com/PhilippRamin*

Twitter: *www.twitter.com/i40zentrum*

Nina Rauwald

is convinced that curiosity and the willingness to learn are the essential for continuous development and improvement for individuals, and thus organizations. She is currently leading international projects and teams, together with external partners that broaden the Learning & Development portfolio for employees on all levels, with special focus on their development paths through the wider organization. As Manager Talent, Learning and Development her mission is to support her divisions in becoming and staying an active part of the learning organization of the Atlas Copco group. Never stopping learning herself, she holds a master's degree in Human Resources and Personnel Development, and an international bachelor's degree in business administration. She has studied and worked in Germany, The Netherlands, Denmark, and the UK and is a licensed trainer and coach, specialized in systematic change projects.

Company: Atlas Copco Group AB, Atlas Copco Vacuum Technique Business Area
Position: Manager Talent, Learning & Development

Linkedin: *linkedin.com/in/nina-rauwald-7600a411a*

Dr. Erich Renz

is a consultant in the Nuremberg office of PD – Berater der öffentlichen Hand. He works in projects involving the modernization of public administration services and is part of PD's Science Group. Prior to that, Erich was a research assistant at the Department of Innovation and Technology Management at the University of Regensburg, a consultant for the Innovation Center for Industry 4.0 in Regensburg, and a product manager at the software company Vuframe in Regensburg. He studied Musicology and Law (B. A.) at the Ludwig Maximilian University of Munich from 2010 to 2013 and followed this up with studies in Cultural and Creative Industries (M. A.) at the University of Popular Music and Music Business Baden-Württemberg (Mannheim), the Queensland University of Technology (Brisbane), and the Amsterdam University of Applied Sciences from 2013 to 2015. For his PhD in economics, which he received from the University of Regensburg in 2021, Erich conducted nudging experiments in the areas of organizational change, entrepreneurial action, and innovation decisions. Research visits took him to the Department of Innovation, Entrepreneurship and Strategy at the Tsinghua University Beijing and the Department of Applied Economics at the Beijing Institute of Technology in 2019. As a lecturer, Erich has taught at the Ansbach University of Applied Sciences, the Deggendorf Institute of Technology, the University of Popular Music and Music Business Baden-Württemberg, and the University of Maribor.

Company: PD – Berater der öffentlichen Hand GmbH
Position: Consultant

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Dr. Alexander Röck

studied theoretical physics in Tübingen and London. He then worked as a research associate at the Max Planck Institute for Metals Research and earned his doctorate at the University of Stuttgart.

Since 1999 he has been a member of staff at Robert Bosch GmbH. There he started in the development of components for gasoline injection systems in various positions.

After heading the competence centers for metal, plastics and simulation, he moved into the role of an internal consultant focusing on lean development, flow-based work organization and digitalization. Since 2016, he has been driving the digital transformation, first in the mobility sector of the Robert Bosch Group including providing basic knowledge as part of numerous training activities. Currently, he is in responsibility for the corporate data strategy at Bosch.

Company: Robert Bosch GmbH
Position: Head of Corporate Data Strategy

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Andrea Schindler

Due to her diverse background, she is convinced that continuous development and learning are the key to success.

She joined Continental in 2014 and has since worked in various areas of the company.

Before joining Continental, Andrea Schindler studied English and Spanish. She completed her education in 2014 with the 2nd state exam.

Andrea Schindler began her career as an executive assistant at the Regensburg electronics plant, after which she worked in lean manufacturing as a trainer and project manager with a focus on process optimization on the shop floor.

In 2018, she moved to HR in a central function responsible for 30 electronics plants worldwide and took over the project management of the "Future Learning" project. A central component was the development of new learning strategies and formats, including the training program for digital competencies in cooperation with the Innovation Center Industry 4.0 in Regensburg, Germany.

Since 2020, Andrea Schindler is in a R&D central function in the software area and leads global HR projects in competence management and agile transformation.

Company: Continental Automotive Technologies GmbH
Position: Global HR Project Manager & HR Business Partner

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Prof. Dr. rer. nat. Ute Schmid

is a graduate psychologist and computer scientist. She received her doctorate and habilitation in computer science from the TU Berlin. At the TU Berlin, she first worked as a teaching associate in the Cognitive Psychology and then as a junior professor in the Artificial Intelligence. She has spent one year as visiting post-doc researcher at Carnegie-Mellon University and worked at the University of Osnabrück as lecturer in the area of Intelligent Systems. Since 2004, she is a professor of Applied Computer Science, especially Cognitive Systems, at the University of Bamberg. She teaches and researches in the areas of Artificial Intelligence, Machine Learning, and Cognitive Modeling. Her focus is on inductive programming, interpretable and human-like (human-level) machine learning, and explanatory and interactive machine learning. Since 2020, Ute Schmid has been a member of the Board of Directors of the Bavarian Institute for Digital Transformation (bidt). She leads the Fraunhofer IIS project group Comprehensible AI. Ute Schmid is intensively dedicated to the advancement of women in computer science and has been offering computer science workshops for children and young people since 2005. Ute Schmid won the Minerva Gender Equality Award presented by Informatics Europe for her university. She holds advanced trainings on computer science for preschool and elementary school and is speaker of the German SIG AI task force AI and Education. For her commitment to knowledge transfer, especially in the field of AI, she was awarded the Rainer Markgraf Prize in 2020.

Institution: University of Bamberg

Position: Professor of Applied Computer Science and Cognitive Systems at University of Bamberg; Head of the Fraunhofer IIS Project Group Comprehensible AI

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Heiko Schmidt

is a creative designer, a thinker and also a chaotic person with a desire to think the present in a new and different way. He dreams of a networked world in which people take care of each other. In which versatility and appreciation are lived. In which the "we" counts more than the "I" and in which people experiment so that even small changes can have a big impact.

He studied business administration with a focus on organizational development and sociology at the University of Siegen, Germany.

After his traineeship at Jaguar Deutschland GmbH with a focus on marketing and sales, he began his further career at AUDI AG in Ingolstadt in 1999. Here he worked in a wide variety of business areas and functions with a focus on strategy development, organizational/personnel development, change/transformation management, as well as in Beijing, to set up a sales academy.

Since 2013, he has been Head of Dealer Development/Training Academy Germany and is responsible for the selection, training and development of the various target groups of the Audi partner organization in Germany.

In addition to these topics, he focuses on topics such as: Transformation/Cultural Management, Educational Research, as well as broader socially relevant future topics.

Company: AUDI AG
Position: Head of Dealer Development/Training Academy Germany

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Katharina Schüller

has almost 20 years of experience in the field of advanced analytics, big data, and artificial intelligence. With the founding of STAT-UP in 2003, she is considered one of the entrepreneurial pioneers in the Statistical Consulting and Data Science segment. She has worked with Nobel Prize winner Kary Mullis, among others, and advises renowned companies, scientific institutions, and the public sector.

She is known to a broad public through numerous lectures as well as publications in professional and popular media on the topics of AI, data literacy and data ethics. Schüller holds several supervisory and advisory board mandates in business and political bodies. She has been a lecturer at various universities since 2005. Since 2020, she has been a board member of the German Statistical Society (DStatG) and chairs the IEEE SA Working Group to develop a global standard for Data & AI Literacy.

The mother of four is a scholarship holder of the Bavarian Elite Academy and the Lindau Nobel Laureate Meetings, "Statistician of the Week" (American Statistical Association), "Vordenker" (Handelsblatt/BCG), laureate of the LaMonachia business award of the LH Munich and of the Digital Female Leader Award in the IT-Tech category.

Company: STAT-UP Statistical Consulting & Data Science GmbH
Position: CEO and Founder

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Anna Simon

is Referent capability development and has been pursuing the securing of the necessary competencies within the company from different perspectives since 2015. In the area of learning & development, qualification initiatives and continuous training measures drive the development of employees in the supply chain. In the field of Campus Marketing, she follows the securing of fresh impulses by young heads through events for students. Her own development in the company started with a training as Event Management Assistant. While working, she completed her distance learning in Educational Science at the FernUniversität in Hagen. In combination with professional experience in the areas of human resources marketing and learning & development, the own educational path enables her to reflect on the needs of each target group. In addition to the strategic conceptual work, working with the human being as a trainer is her passion. She knows: A future-oriented development of competencies is based on the transfer of internal knowledge through a variety of approaches. With a 360-degree view, she creates an open mindset for lifelong learning and inspires others to share the own experiences.

Company: Coca-Cola Europacific Partners GmbH
Position: Referent Capability Development People & Culture

LinkedIn: *www.linkedin.com/in/anna-simon-877564211*

Jana Sonntag

joined AstraZeneca Germany as VP Innovation & Business Excellence and member of the German Management Team in 2019, responsible for turning the "IBEX" department into an "integrated power-house" providing digital expertise and innovative omnichannel delivery to all business functions and therapeutic areas. With more than 20 years' experience in senior management, her international career has focused on digital transformation, new promotional models in commercial and business process reengineering in Pharma Operations, Quality and IT.

Jana founded the Fresenius Kabi Digital Lab as in-company startup to build and market innovative digital healthcare products. In senior management at Accenture, she drove Innovation & Thought Leadership in Life Sciences for the DACH region. At Teva ratiopharm Germany Jana was Head of Commercial Shared Services, which she turned into a powerful multichannel delivery partner and recognized think tank for the Medical, Marketing & Sales Units within Specialty Medicines, Generics and OTC.

At Boehringer Ingelheim, Jana began as a dual student of Computer Sciences & Economics and became Project Manager Engineering in the FDA readiness project in France, Head of Packaging Material Technology in Spain, Global Compliance Officer responsible for the company-wide IT Infrastructure Computer System Validation and head of building up digital marketing and social media.

Jana completed executive training in leadership at the St. Gallen Management Institute.

Since 2020 Jana chairs the vfa subcommittee Digital Health.

Company: AstraZeneca Germany

Position: Vice President Innovation & Business Excellence

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Nils Stamm

has been Chief Digital Officer of Telekom Deutschland GmbH since 2017 and Head of Internet Sales Channels since 2019. In this roles he was responsible for the digital transformation and digital business success.

His over 20 years of professional experience in leading companies with focus on marketing, product management, sales and strategy are proof of his passion for digitalization. After graduating, he held various positions at Feedback AG, WEB.DE, o2 Germany and Buongiorno S. p. A a NTT DOCOMO Company London.

He also served as Vice President Marketing & Sales for United Internet Media and 1&1 Mail & Media.

Company: Deutsche Telekom
Position: Chief Digital Officer

LinkedIn: *https://www.linkedin.com/in/nils-stamm-4b18066/*

Milaid Stephan

Milaid's professional and private life is characterized by a constant curiosity to gather new experiences and impressions, as well as the motivation to awaken this desire in other people.

For many years, Milaid has brought both of these qualities to bear in his role as part of AstraZeneca's internal training department. There, Milaid Stephan is currently responsible for internal capability building qualification offerings as part of AstraZeneca Germany's digitalization strategy and, together with his team, implements target group-specific training offerings for the sales and medical sales force as well as marketing. In addition, Milaid Stephan is responsible for company-wide qualification offerings for AstraZeneca employees as part of the introduction of agile working methods.

Before starting his career at AstraZeneca, he studied biology and then started his career directly in the pharmaceutical industry for AstraZeneca in the field sales force after receiving his diploma in 2009. There he first took over the scientific training of the field sales force in the indication type 2 diabetes and before he then focused on the topic of capability building, Milaid Stephan took the opportunity to take on a leadership role in sales for some time. Milaid Stephan is also a certified trainer and systemic coach.

Company: AstraZeneca Germany
Position: Head of Capability Development

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Andrea Stich

In her current role as the head of an internal academy at Infineon Technologies, Andrea Stich combines her two professional passions – physics and teaching.

After studying humanities in theater and German language and literature at the LMU Munich, she graduated with a degree in physics from the Munich University of Applied Sciences. In 1995, she started her career as a technology developer and worked in various project leadership and management roles at Siemens and Infineon until 2013, when she founded a global internal academy in Operations. The goal of her organization is to equip employees in their professional roles within the company with the right functional competencies to contribute to the company's success.

The certification as an "Intercultural Business" trainer and her many years of lecturing at the OTH Regensburg form the basis for her own trainings, in which she trains experts to become internal functional trainers in both virtual and real classrooms.

Since 2018, Andrea Stich has been actively contributing her expertise and experience in technology and teaching to the BMBF's "Plattform Lernende Systeme" in the area of the impact of applied artificial intelligence on careers and vocational training.

Company: Infineon Technologies AG
Position: Director Frontend Academy

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Dr. Laura Stiller

is a Senior Consultant for Financial Markets at IBM and advises financial service providers on the development of innovative financial products. In parallel, she is a lecturer at TH Munich and TH Deggendorf and gives lectures on Innovation & Technology Management as well as Digitization & Digital Transformation and Fintech Startups. Previously, Dr. Stiller was a research assistant at the Chair of Innovation and Technology Management at the University of Regensburg. Her research interests are digital assets, digital platforms, digital platform ecosystems and networks, AI applications on platforms and coopetition with focus on the financial sector. Her work has been presented several times at the Academy of Management.

She received her Master of Science in Business Administration from the Catholic University of Eichstätt-Ingolstadt and Copenhagen Business School. She completed her Bachelor's degree in Business Administration B. Sc. at the University of Regensburg. During her studies, Dr. Stiller gained practical experience in the fields of strategy and IT consulting at Osram in Regensburg, Maschinenfabrik Reinhausen in Montréal, IBM in Walldorf and Capgemini Consulting in Frankfurt am Main.

Company: IBM Deutschland GmbH

Position: Senior Consultant, IBM Consulting

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Dr. Roland A. Stürz

is Head of Think Tank at the Bavarian Research Institute for Digital Transformation (bidt). He was previously a Senior Research Fellow at the Max Planck Institute for Innovation and Competition in Munich. Prior to that he worked at the Institute for Innovation Research, Technology Management and Entrepreneurship of the Ludwig-Maximilians-Universität, Munich. Dr. Stürz studied management at the Ludwig-Maximilians-Universität in Munich and at the Copenhagen Business School. He holds a diploma degree in management, a Master of Business Research and a doctoral degree from the Ludwig-Maximilians-Universität. He regularly teaches a course on innovation policy at the Munich Intellectual Property Law Centre. He has published or contributed to a variety of policy papers on topics dealing with the German innovation system and the digital transformation. His research interests are in the domains of digital transformation, innovation policy and industry evolution. Currently he focuses on the digital transformation of the world of work with topics like digital competences or work from home.

Company: Bayerisches Forschungsinstitut für Digitale Transformation (Bavarian Research Institute for Digital Transformation, bidt)

Position: Head of Think Tank

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Dirk von Gehlen

SZ Institut

is an author, journalist and speaker. The journalism graduate works as "Director Think Tank" at the SZ Institute. He not only thinks about new ideas ("Anleitung zum Unkreativsein," Rheinwerk 2021), but also implements them: For the Süddeutsche Zeitung, for example, he helped develop the longreads magazine Süddeutsche Zeitung Langstrecke and the newsletter Klimafreitag.

Together with the BIDT, he developed the concept for the bidt-SZ digitalbarometer because the topic of digital transformation has accompanied the native of Mülheim since the beginning of his professional career. For him, the digital copy is the central driver of the digital revolution (Mashup, Suhrkamp-Verlag) and the shruggie is the perfect symbol for a creative attitude toward the new (Das Pragmatismus-Prinzip, Piper-Verlag). Dirk von Gehlen lives with his family in Munich - and on the Internet.

Company: SZ-Institut Süddeutsche Zeitung
Position: Director Think Tank

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Katharina Winkler

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is an expert on the topic of the future of work. Her focus is on a human-centered, value-based approach to digital change. Her guiding themes include lifelong learning approaches, new work and leadership models, and digital (continuing) education.

Since 2019, she has been a policy advisor and scientific officer at acatech, the German Academy of Science and Engineering. In the field of economics, education and work, she is responsible for the topic of the future of work and, among other things, project manager of acatech's Human Resources Circle, a forum for HR boards on the future of work.

Previously, as an independent consultant, systemic business coach and trainer, she specialized in leadership, HR and team development in the context of digital transformation. She has also been involved in general vocational preparation for low-skilled and immigrant workers to support their integration into the labor market. She sees education as a key to not only supporting the digital transformation, but also actively participating in and shaping it.

After studying political science and communication at the Universities of Jena and Augsburg, she worked for the Goethe-Institut e. V. as a junior manager in the areas of culture and education in New Zealand and at the headquarters in Munich as deputy head of "Human Resources Development Worldwide".

Institution: acatech – National Academy of Science and Engineering
Position: Policy Advisor/Scientific Consultant

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Grit Zimmer

joined the Volksbank Mittweida eG in 2001 as a trainee in the first stage of her career to become a banker. In 2008, she started an additional qualification from the Frankfurt School of Finance & Management. After completing her banking administration degree, she became head of the private mortgages department. In addition to advising mortgage customers, she oversaw the strategic development of the department and paved the way towards its digital transformation. Grit Zimmer's work is characterized by a strong customer orientation, optimizing processes and expanding digital expertise. In 2019, she embarked on a new challenge by joining the organization development team. Grit Zimmer can now be found at the helm of the digitalization campaign, guiding the introduction of agile work methods and working on a wide range of other topics that are crucial to the future success and ongoing development of the company.

Company: Volksbank Mittweida eG
Position: Member of the Organisation Development Team

LinkedIn: *www.linkedin.com/in/grit-zimmer-05a92a1b2/*

Prof. Leonhard Zintl

is a banker, member of the cooperative, author, editor, conference speaker and a highly passionate innovator. After completing his apprenticeship at a Bavarian cooperative bank, he moved his workplace to Saxony in 1991. He rose through the ranks starting as a young manager, becoming a board member in 1997 and taking on the role of CEO of Volksbank Mittweida eG in 2009. He is an active member of the committees of the cooperative financial network, volunteers in associations and organizations in his local region and beyond, and is actively involved in regional politics. "Take the initiative" is the motto that guides him. He passes on the ideas, values and insights gained from this approach to his three children, his co-workers, the management team and many others along the way. With an optimistic eye to the future, bold actions and the ability to turn visions into reality, Leonhard Zintl empowers people who want to make a change.

Company: Volksbank Mittweida eG
Position: CEO

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Digital Competence in Pharma Marketing & Sales – Our Learning Journey at AstraZeneca

Jana Sonntag and Milaid Stephan

About AstraZeneca

AstraZeneca (LSE/STO/Nasdaq: AZN) is a global, science-led biopharmaceutical company that focuses on the discovery, development, and commercialization of prescription medicines in Oncology, Rare Diseases, and BioPharmaceuticals, including Cardiovascular, Renal & Metabolism, and Respiratory & Immunology. Based in Cambridge, UK, AstraZeneca operates in over 100 countries and its innovative medicines are used by millions of patients worldwide. Please visit astrazeneca.com.

5.1 Executive Summary

Pharma operates in a highly regulated environment.

Digitalization in Healthcare is a top priority in the world and accelerating in Germany.

The COVID-19 pandemic acts as catalyst for digital transformation.

The Pharma Go-to-Market model is transforming from a Field-Rep-centered approach towards Omnichannel Orchestration.

Omnichannel is centered around the customer, not the brand. Omnichannel campaigns are a continuous journey resulting in constant learning and adaptation. not a project with Big Bang Launch and defined end after some months.

Precondition for Omnichannel is marketing automation. This requires Sales, Marketing and Medical to pay attention to who is engaging with the content, when the customers are engaging and how they're engaging with it, in addition to what they're engaging with.

To cope with the "New Normal", Sales, Marketing and Medical functions need to adopt a mindset that's responsive and iterative and to embark onto a new way of working – cross-functional, data-driven and customer-centric down to the individual level.

5.2 Regulatory Environment and Context for Change

Research, development, approval of new drugs, manufacturing, and commercialization are regulated in laws. Even though diseases and patients' needs are the same around the world Healthcare Systems are different in every country. As a consequence, market access criteria, drug pricing processes and reimbursement schemes are country-specific. This has a high influence on what is considered a 'value-adding drug', who pays for this and how much. Data Privacy regulations and drug advertisement restrictions come in addition.

5.2.1 The German Healthcare System

The German Healthcare Systems is a network of 1,900 hospitals, 150,000 physicians and 19,500 pharmacies with in total 5,7 Mio. people working in the German Healthcare Sector [BuGes 2022]. Germany spends 11.1% of annual GDP (391 Bn. EUR in 2018) on healthcare expenditure with public and private health insurance contributions covering the majority of healthcare cost. Every German resident must have a health insurance, hence 83 Mio. inhabitants are entitled to medically necessary public healthcare.

5.2.2 Digitalization in Healthcare

The German Healthcare market is facing growing expenses due to an aging population, significant shortage of physicians and nurses, and high inefficiencies in healthcare administration processes. Therefore, the German Government paved the way for Digital Healthcare with seven large legislative initiatives from 2019–2021. As the first country in the world, Germany has established Digital Health solutions as a separate category – next to drugs, medical devices, and remedies – with clear market access criteria and an independent reimbursement scheme.

The use of telemedical services increased by factor 900 to 2.7 Mio. teleconsultations in 2021; all hospitals, 80% of all physician offices and 75% of all pharmacies are now connected to the Telematic infrastructure which is the precondition for the electronic patient file (ePA). 9 out of 10 pharmacists believe that the electronic prescription (eRezept) will accelerate the shift towards Online pharmacies [RiSi2021].

Digitalization in Healthcare is also amongst the top priorities for the European Union. The European Commission has launched the 2022 EU4Health work program with a budget of €835 million to invest building stronger, more resilient health systems aiming towards a European Health Union. The focus of this program are crisis preparedness, disease prevention, health systems and healthcare workforce, and digitalization [Euro2022].

5.2.3 COVID-19 as Catalyst for Digital Transformation

COVID-19 is the gamechanger for digitalization in the German Healthcare system.

The COVID-19 pandemic is the gamechanger for digitalization in our healthcare system. This shift to digitalization can be a powerful force in achieving health equity when we rethink the fundamentals of healthcare delivery [Kamin2022]. New reimbursement regulations for telemedicine and eHealth were put in place and path the way. Healthcare providers and physicians now embrace the benefits of virtual patient-physician or physician-physician interactions as

well as remote health monitoring solutions. Patients became open to use digital health offerings and even to provide their data if they understand the benefit for themselves.

5.3 The "New Normal" in Pharma Marketing and Sales

Every day in physicians' life in hospitals and doctor's offices is planned down to the last minute with patient appointments and heavy administrative burden. Already before the pandemic it was a challenge to integrate the approximal ten minutes of a Pharma Rep visit into the daily routines. So even if the personal direct contact with a Sales Rep remains an important means of interaction until today, physicians now also highly value information offerings via virtual meetings and personalized digital channels.

Omnichannel is the "New Normal" for Pharma Marketing and Sales. True Omnichannel is storytelling along the customer journey providing the right information at the right time via the right channel to the right customer.

More valuable customer contacts at lower cost and with higher frequency are the key benefits of Omnichannel.

AstraZeneca defines Omnichannel as "a seamless customer experience, personalized using real-time insights, coordinated across physical and digital channels" (Figure 5.1).
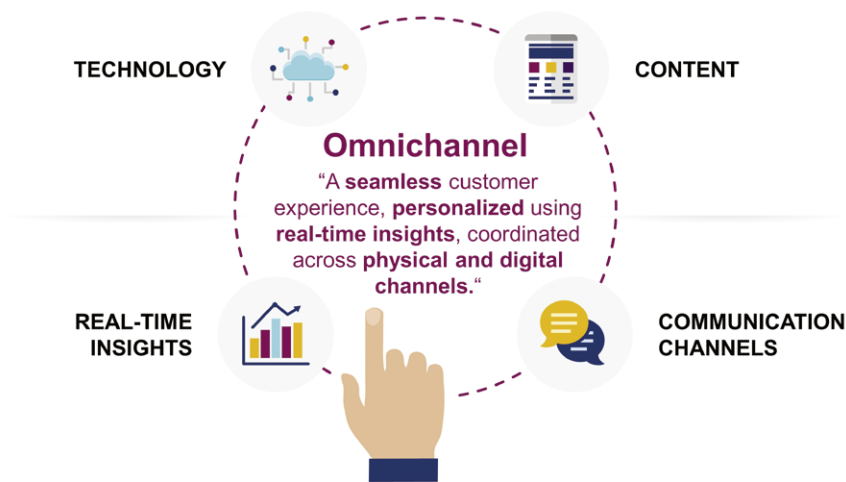
Figure 5.1 Omnichannel at AstraZeneca

5.3.1 The Sales Rep as Orchestrator of Omnichannel

Pharma Sales Reps will always remember March 16th, 2020 – the first day of the National Lockdown. All of a sudden Sales Reps found themselves grounded at home, forced to communicate with customers only via remote and digital channels and trying to save long planned events by switching them to virtual formats. Since then, Channel dynamics [IQVIA2022] have shifted significantly towards digital channels (Figure 5.2). In 2021, digital interactions happened 2.5 times more often than in 2019 (14.4 Mio. vs. 5,83 Mio.) and F2F interactions decreased almost by 50% to 9.2 Mio. F2F interactions in 2021 compared to the 17,5 Mio. F2F interactions in 2019:

F2F - Detailing with Rep
F2F - Meetings/Events
Remote - Detailing with Rep (Telephone, voice only)
Remote - Detailing with Rep (Online)
Remote - Meetings/Events (Live, Streaming)
Digital - Detailing (Automated, Self guided)
Digital - Meetings/Events (Prerecorded, Streaming)
Digital - E-Mailing
Digital - Instant Messaging/Texting
Mailing (Postal)
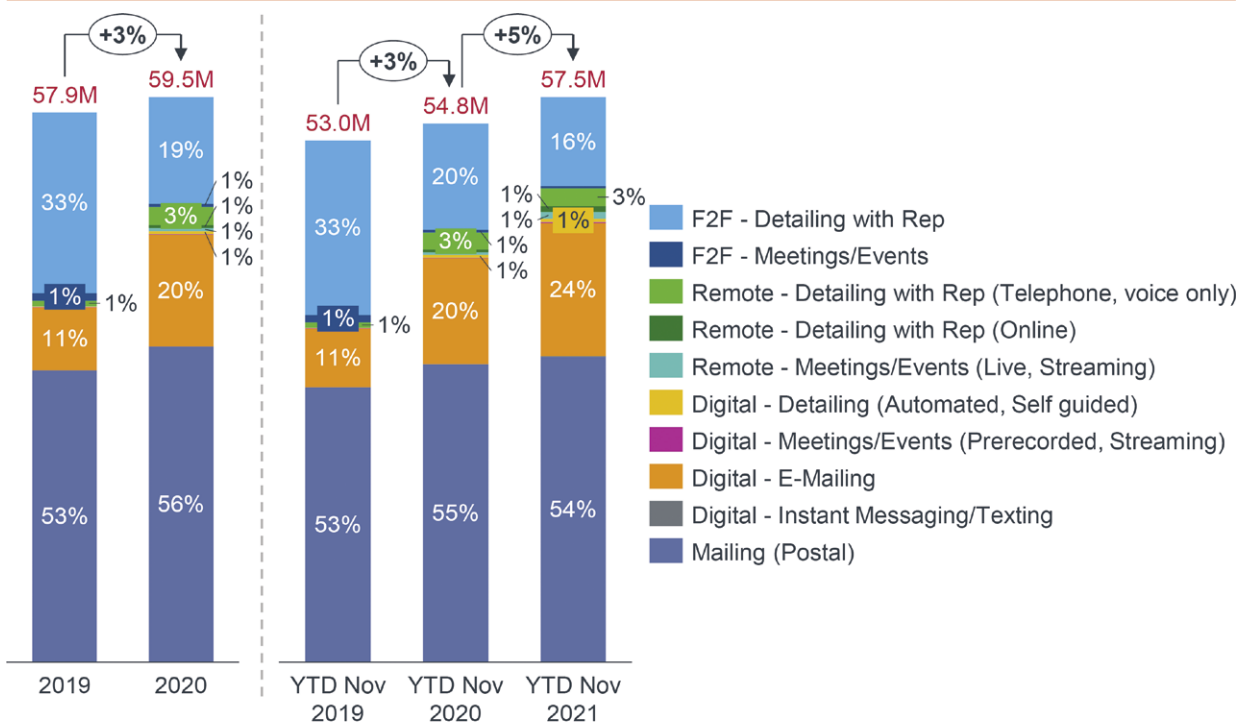
Source: IQVIA Global ChannelDynamics
Note: YTD data is till NOV for 2019, 2020 and 2021
Impact of COVID-19 on the Pharmaceutical Market – EU4 & UK - Dec 2021

Figure 5.2 Share of projected promotional volume 2019 vs. 2020 and year-to-date trends over three years in Germany

In Omnichannel, Sales Reps become the orchestrators of information across all channels to develop each customer individually along his personal adoption ladder. Plus, the Sales Reps are a direct feedback loop back to the Marketing about campaign success and optimization potential. This new role requires a different set of skills and capabilities than Sales Reps needed in the past.

Sales Reps become Orchestrators of Omnichannel

Like a conductor needs to know the sound and potential of each instrument in the orchestra, a Sales Rep needs to anticipate how a certain information provided via a given channel resonates with a specific customer. Sound customer understanding, pronounced analytical skills, high degree of technical savviness and in-depth understanding of Legal, data privacy and compliance regulations are core competencies. Engaging, selling and communications skills in personal, remote and digital interactions are key for success. Personal qualities like persistence, resilience and a positive, forward-looking mindset ensure that the Sales Rep can thrive in a complex and rapidly changing Business environment.

How Did We Develop the more than 800 Sales Reps to Really Become Omnichannel Orchestrators?

To build the necessary capabilities for bringing omnichannel to life in the field, we did three things for our Sales Reps.

1. First, we created a central image to frame their new role profile and we made specific decisions to strengthen their role as the main contact point for physicians with AstraZeneca – the rep as the orchestrator of all channels (Figure 5.3). With this, every customer interaction is always triggered by the Rep. And we mean it. For example, there are no mass emails from marketing to the customers. The rep is in full control, he is the main point of contact for the customer, and he has full responsibility for what content to use for which customer,

via which channel and when. As a result, the Rep's customer relationship is strengthened by his or her highly individualized interactions.

2. Second, we have developed our so called "digital driver's license" which consists of several self-study modules complemented by a series of workshops to build up and train the skills of the Sales Rep for working in an omnichannel environment. Key to success was that the Reps had the chance to train their new way of working as realistically as possible. For this, we designed the learning journey alongside a typical day in the field and not a system or process training. During the training Reps were asked to take at least two specific customers of theirs and to plan an individualized contact journey including all available channels, which they then had to implement in real life.

3. Third, we have adapted our training concept for campaign trainings, e.g. at field sales conferences, so that they not only receive an update on the new content of the campaign, but also train immediately the implementation of the new elements of the omnichannel campaign again based on at least 2 of their accounts building on the methods learned during the capability trainings.
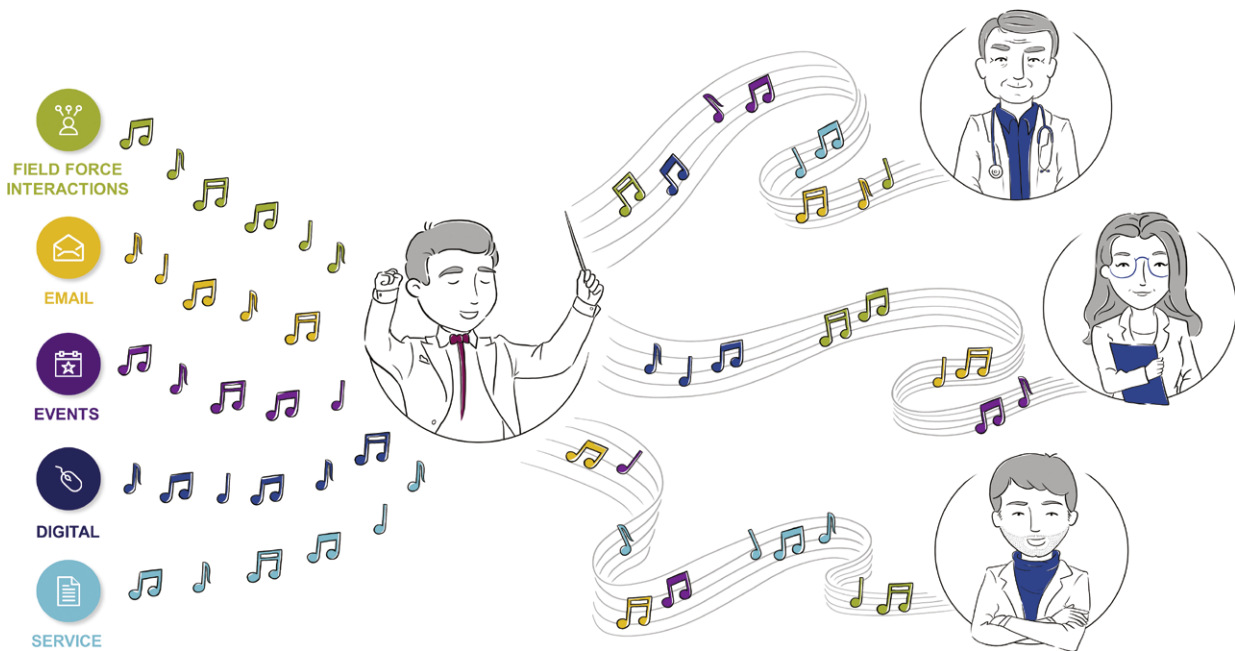
Figure 5.3 The rep as the orchestrator of Omnichannel

The goal is to achieve a sustainable and successful implementation of omnichannel campaigns which is then measurable through the newly introduced Omnichannel score. The omnichannel score is a new KPI that reflects all interactions with customers managed by the reps and thus naturally also creates an additional incentive for the reps to really leverage the potential of omnichannel.

With this approach, we were able to create confidence, curiosity, and willingness to implement this new way of working.

5.3.2 Marketing as Omnichannel Strategist

In the past, Brand teams focused strongly on the F2F contact of the Sales Reps with the customer. Digital and virtual channels were perceived as additional, facultative service. As a result, content was mainly tailored for the F2F interaction and – since basically just recycled – lacked format and audience-specific relevance for the other channels. Omnichannel now requires engaging, concise, and consistent storytelling across all channels, personalized to the specific customer's needs. This "New Normal" is dramatically changing the way of working for Marketeers. Campaign strategies need to be developed based on customer segments, aligned to phases in the adoption ladder and mapping content and format to the respective personal, virtual and digital channels. This requires the Brand Managers to build a comprehensive understanding of customer behaviors and beliefs in order to be able to tailor the right communication strategy to each customer. Only then can the campaign strategy be developed by designing a consistent storyline out of key messages as well as supporting messages based on the objectives from the overarching strategic brand objectives. Marketing automation knowledge is a mandatory pre-condition for designing and detailing the campaign journey for all commercial channels based on triggering rules as well as content and channel orchestration logics in order to consolidate the omnichannel customer experience.

In addition, the Brand Manager needs to comply with industry-specific regulations like the "Act of Advertising in the Field of Health" [BuMed2014] which sets the boundaries for Pharma Marketing & Sales. There are differences between "Over-the-counter products", which one can buy directly in a pharmacy, and prescription-bound products. AstraZeneca is only selling prescription-bound products and to us drug marketing reminds of a game of three-cushion billiard:

- **You are not allowed to mention your product's name** to the patient – you may only provide objective information to proven Healthcare professionals. What "objective information" means is defined by law, and you need to prove that the Healthcare Professionals you are approaching are certified according to the law.

- **The one who needs your product** – **the Patient** – **is not necessarily the one who pays for it** since this is usually the health insurance

- **As a marketeer, you are not allowed to ask your customer for feedback** or to gather any direct patient data for commercial purposes, so you need to rely on anonymized, aggregated information via third parties

> In the end, Brand Managers become chess players – constantly observing and analyzing the other one's moves to take advantage for his or her own strategy, taking calculable risks and always thinking ahead.

How Are We Getting the Brand Managers onto the Journey?

For enabling the brand managers to take over the role as the chess player AstraZeneca has developed the so-called Omnichannel Playbook, which provides colleagues in marketing with step-by-step guidance of how to design, build and monitor data-driven omnichannel campaigns, the roles to be involved along the process and relevant metrics. This Omnichannel Playbook is a very good and comprehensive manual, but we are convinced that before the "How?", it takes a moment to explain the "Why?" to create an openness and curiosity for 'The New'.

So, let's play! We partnered with an innovative startup that had developed a (digital) business process board game platform, to create our "Omnichannel Challenge" (Figure 5.4). The original idea of that platform was to help startups to understand the full scope of what it takes to set up

a company and to get venture capital. We adapted the approach towards designing Omnichannel campaigns and pitching for budget considering them to be a business case. In our "Omnichannel Challenge" participants compete in teams to develop an Omnichannel campaign from idea to launch and to successful implementation. They must skillfully select the right resources, target the budget and defend their ideas in a pitch to "investors". During the game there are a lot of surprise elements and unforeseeable challenges the teams need to cope with. As a result, participants understand why and how to work together with the different roles and in cross-functional teams, and they get to know the approach, processes and tools needed to design and implement Omnichannel campaigns.

With our "Omnichannel Challenge" we have an instrument at hand that adds the fun of gamification in the capability building process around the mindset and methods necessary for successful Omnichannel campaigns.

Figure 5.4 Learning through gamification – the "AZ Omnichannel Challenge"

5.3.3 Medical as the Kingmaker

"Science first!" – this is the answer of physicians when asked what kind of information they would like to get from Pharma. Mode of action, therapy scheme, safety profile, patient cases and of course updates on new study data are regularly leading the information wish list. All this content is provided by Medical. In addition, as per the "Act of Advertising in the Field of Health", any promotional content needs to be approved before use by the medical role "Nominated Signatories".

Physicians prefer crisp, concise and easy ways of information provisioning and this is where nowadays virtual congresses and events as well as digital channels like emails, personalized Pharma web portals but also 3rd party platforms come into play.

While Marketing owns the Communication Strategy, Medical is the Premium content contributor. Since Omnichannel lives from personalization, content needs to be provided in modules:

Medical content is premium – best in modules to fit into the Omnichannel puzzle!

- Adapted for each customer segment (e.g. GP or Specialist, therapeutic area)
- Respecting tonality per persona (e.g. "The Scientific-interested", "The Patient-focused", "The innovative Simplifier")
- Appropriate format (e.g. Text, Video, Podcast)
- Considering the channel (e.g. F2F via iDetail, email, event, personalized web portal)

This level of content detail, variety of content module combinations and context is a totally new requirement for the Medical Affairs Managers as content contributors and the Nominated Signatories as content approvers. New ways of content definition, creation and tagging require a new way of cooperation between Medical and Marketing. The modular content approach is only possible with a new content approval process based on a rule framework which content items are allowed to be assembled for which target group via which channel instead of submitting a plain PDF-document with some general metadata.

> A consistent content platform from content planning to creation to approval to decommissioning needs to be put in place and everyone – Brand Teams and their agencies as well as Medical content providers and the Nominated Signatories – need to embrace the new processes and tools.

How about Legal Pre-Conditions for Omnichannel?

In addition to the necessary internal pre-requisites for the successful development and distribution of content, there is a crucial external requirement that must be met in order to contact persons for direct marketing purposes via digital channels (e.g. via e-mail) in nearly all cases – the opt-in.

Within the framework of German competition law, it is clearly defined that digital contact for commercial content (direct marketing activities) is in general only allowed with the prior documented consent of the recipient/person contacted. Because of this, the European Data protection regulations (GDPR) also require a consent for the lawfulness of the associated data processing. This creates a new process to be integrated into the daily routine for our sales representatives (Figure 5.5).

Figure 5.5 Clear communication is key – especially on mandatory external requirements

Important: **No mailings without documented opt-in!!!
Not even if you know the doctor for a long time!**

There are no centralized mailings from AstraZeneca! Each field representative retains sovereignty over what digital content he/she sends to which HCP (healthcare professional).

Each email and each virtual contact with an HCP is personally decided by each employee aligned with the individual needs of the HCP.

For this, it is crucial to educate the HCPs about this and thus obtain their opt-in for the appropriate use of the email address.

The Story of the Dream of the Audi Learning Valley to the Reality of Audi Virtual Trainings (AVT)

Heiko Schmidt and Christiane Nicolai

Thinking the FUTURE in the conventions of TODAY, keeps us in TODAY, at best. But mostly it brings us back into the PAST.

1.1 The Dream

It was again one of those days, which I spent thinking a lot. Thinking about everything under the sun – about yesterday, today, and tomorrow. What will my children's world look like? What will be possible tomorrow that seemed impossible yesterday and still seems impossible today? How will we live and how will we learn?

Will learning take place primarily digitally, and if so, what will it look like? Inspired by the idea of raising learning to a digital, different level, the idea came to me to build a kind of "learning homeland". A "homeland" where learners simply feel at home. Everything would have to be possible there, always and everywhere.

Learning as a digital multimodal approach was born in my mind. Learners should be able to learn in a fun, playful, location-independent and, above all, contextual way.

Modern society meanders between a wide variety of worlds. Clear demarcations between work life and private life are becoming increasingly blurred. And so, learning and the constant thirst for knowledge is becoming omnipresent. Learning as a digital and multimodal construct is becoming a constant companion of a modern and urban society.

Learning takes place like this at work, on the way to work, in the car, on the train, on the plane, in leisure time, simply everywhere and constantly.

The idea of a "learning homeland" sounded a bit old school. Another name was needed. After a few thought loops and mental ramblings, the idea of Audi Learning Valley popped up. A major digital learning hub for the Audi partner organization. Learning should take place there in a completely different, exciting and playful way. And so, together with our development partners Straightlabs (*https://www.straightlabs.com*), metricminds (*https://metricminds.com*), Fantastic Realms (*http://fantastic-realms.com*), we set out on an unknown and challenging journey.

Why playful? We came up with this impulse when we asked ourselves how we could manage to enable self-organized learning apart from partly unloved WBTs in such a way that it is not perceived as an annoying duty, but is fun, enriching and also awakens the desire to discover – just like in playful learning.

In this context, learning through playing is far more than just a thought construct. Already 200 years ago, Friedrich Schiller emphasized the importance of playing in his letters "On the Aesthetic Education of Man".

"For, to finally say it all at once, man only plays when he is in the fullest sense of the word a human being, and he is only fully a human being when he plays."

Friedrich Schiller

Man is on the one hand a learning being and on the other hand a playing being.

The Dutch art historian Johan Huizinga (1872–1945) published his major work "Homo Ludens: On the Origin of Culture in Play" in 1938, laying the foundation for later play research. For Huizinga, the question of why we play is perfectly clear. Playing makes it possible, on the one hand, to feel and experience conventions and, on the other, to transcend them at the same time without danger. In play we can try ourselves out, gain experiences that reality cannot provide.

And with that the **Objective of Audi Learning Valley** was clear:

Learners should be able to try things out playfully in a self-organized learning process.

Qualification and virtuality as a modern symbiosis developed and designed according to scripts, emotional and inspiring films. And to add to this, in combination with the captivating attributes of the gaming world.

1.2 The First Steps into Reality

Ok, the goal was clear. But, how now the goal and the associated methodical approach:

- **Films** create an emotional connection, exciting moments and identification.
- **Games** are voluntary and interactive, have goals, conflicts and rules. They are challenging.
- **Trainings** create problem awareness, competencies, access to knowledge and a transfer and thus action competence in and for practice.
- Linking them with each other in a meaningful way?

In order to realize such a project, it is absolutely necessary to put aside existing conventions and to really think the new in a new way. It is about the conscious journey to Neverland.

We had to open ourselves up to new, hitherto unfamiliar competencies and industries. We had to rethink and set up our project far away from the familiar development paths for training. We had to say goodbye to familiar processes and structures. We had to immerse ourselves in completely foreign worlds, if we wanted to implement the methodological approach professionally.

Somehow, we agreed very quickly that we would not get anywhere with the conventional ways of developing e-learning that we knew and had established. We had to mentally travel to Neverland. A place we hadn't set foot in for a long time. A place where conventions are a foreign word. A place where thinking differently is possible.

1.3 Dealing with the "Others"

As mentioned, we had to leave familiar paths of conventional e-learning development and design. So we set out to find the "other" players. And in doing so we entered into a critical, yet always constructive dialog with representatives from worlds that were previously foreign to us:

- Game Development
- Game Technology (3D Real Time Engine)
- Game Design
- Art Design
- Film Production
- Direction
- Screenplay
- Research and science

It was a strange and at the same time fascinating world that we then entered into. A world that, from our point of view at the time, was almost unfathomable and into which we tried to dive deeper and deeper.

So, off to gamescom, the world's largest trade fair and event highlight for interactive games and entertainment. And right in the middle of it all we stood with our dream of Audi Learning Valley.

We went looking for development partners, had what felt like millions of conversations and realized that even though we spoke the same language, we didn't really understand each other. Still, giving up was never an option for us anyway, and so bit by bit we slowly grew closer to understanding each other, and our dream continued to take shape.

With the new development partners on board, we learned to understand the "games world" more and more. This was different and kind of "nerdy", but highly professional, innovative, creative and captivating. All attributes that we also wanted to implement.

> - In our imagined new interactive and virtual learning world, work and training should merge into an explorative, self-organized learning process.
> - Fascinating graphical 3D worlds, motivating game attributes and captivating dramaturgical film sequences should lead to a cognitively demanding learning experience.
>
> Thus, learning as a voluntary and interactive action can satisfy the human desire for reward and recognition.

Almost euphoric, we dove deeper and deeper into the future Audi Learning Valley. New ideas were born and requirements evaluated and validated.

Audi Learning Valley increasingly became for us the answer for an inspiring, virtual and mobile learning world in which the learning experience and learning transfer were combined.

1.4 Step by Step towards Reality or the Real World Powered by Game Technology

It quickly became clear to us that if we wanted to do justice to our claim of a multimedia, fascinating learning world, only a modern game graphics engine could be used.

The surface or graphic quality should correspond to that of a "Triple A game".

"Triple A" is an informal classification or grading in the video game industry. The term is equivalent to the word "blockbuster" used in the movie industry.

Wikipedia

It was important for us to create a photorealistic impression of the virtual world, in which artificial characters (avatars) enter into dialogue with our target groups.

However, it was not so easy for us to find the right avatars for us. In the gaming world, most avatars have a martial appearance. They are rather fierce, wild and very combative and therefore not really suitable for our learning world.

However, since we wanted to implement a surface or also graphic quality, as described, which should come very close to the "Triple A games", we had no choice but to create our avatars ourselves.

In doing so, the avatars are tailored exactly to the Audi CI, as well as the overall look & feel of Audi Learning Valley.

Realistic movement patterns are recorded in a special process (motion capturing) and transferred to the avatars.

Figure 1.1 Examples of the first avatars: prototype

Figure 1.2 Examples of the first avatars: prototype

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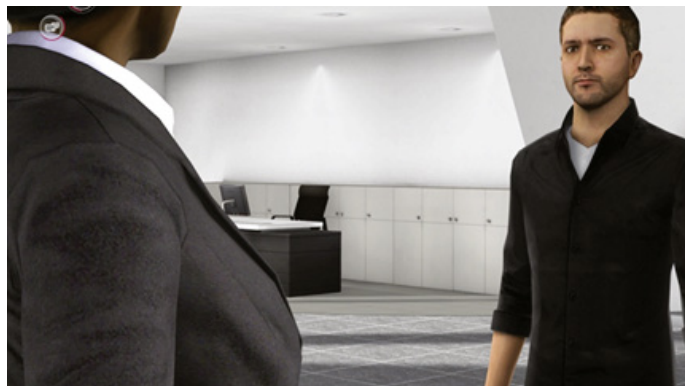
While we were overjoyed to be able to bring our own avatars to life, they did not meet our self-imposed quality standards. We wanted to make the digital world more realistic than we actually managed with the first version of avatars.

The challenge was to deal with the phenomenon of the "Uncanny Valley".

Uncanny Valley or acceptance gap is the term used to describe a previously hypothetical and seemingly paradoxical effect in the acceptance of presented artificial characters by the audience.

Originally described in 1970 by Masahiro Mori, a Japanese roboticist, as the "uncanny valley phenomen" (jap. bukimi no tani genshō), this effect now refers to the phenomenon that the acceptance of technically simulated nonverbal behavior depends on the reality content of the presented carriers (robots, avatars etc.), but does not increase steadily monotonically with the anthropomorphism (the human-likeness) of the figure, but rather records a sharp dip within a certain range.

While one would initially assume that viewers of computer gamers would be more accepting of avatars presented to them, the more photorealistic the figure is designed, in practice it turns out that this is not true. People sometimes find highly abstract, completely artificial figures more likeable and acceptable than figures that are particularly human-like or naturally designed.

According to this theory, acceptance drops off abruptly above a certain level of anthropomorphism and only rises again above a certain, very high level. Acceptance would then be at its highest when the imitations could no longer be distinguished from real people at all.

Wikipedia
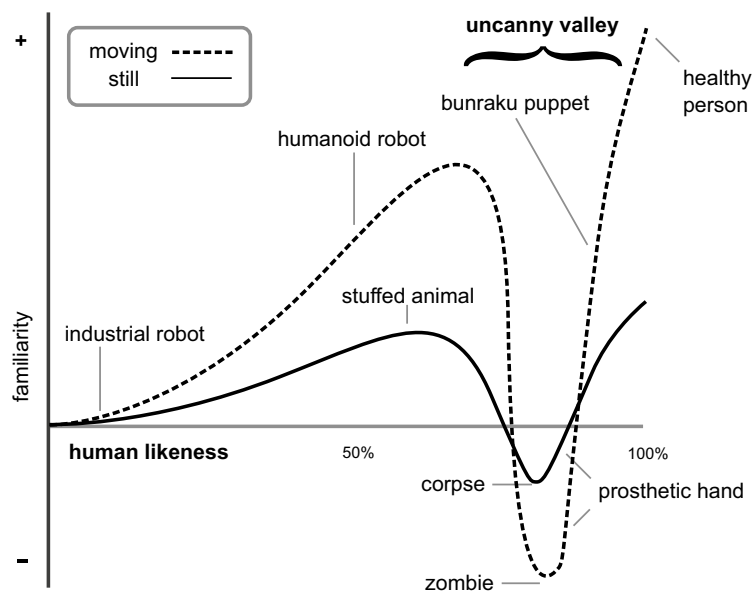
Figure 1.3 Uncanny Valley (Mori)

Thus, the great goal for us was to breathe as many human emotions as possible into the protagonists, the artificial characters.

> The development of Audi Learning Valley showed us that such a dream cannot be realized with proven competencies and processes. What is needed is an attitude of constructive failure.

The Path from the Real Model to the Artificial Character

So, it's off to the model casting and then to the photo studio for the shoot.

Another step on the way to the realization of our dream has been taken.

Based on the photo shoot, the artificial characters were brought to "life" in the Game Studio. In the process, the avatars were equipped with a variety of facial bones and facial expressions, as well as predefined phonemes.

In a further step, lip sync was then adjusted to the level of the audio using highly specialized software.

> Here, however, we can already say in retro perspective that this step is no longer necessary in our current release stage. This is now done by an "AI".

> We never thought that the effort to realize the dream would be so enormous. In addition, we learned that gamification requires many more clusters of competencies that we had to build up.

1.5 From the Construction to the Model

In addition to bringing the avatars to "life", the next step was to make the car dealership context as realistic as possible.

After all, Audi Learning Valley should reflect the environment in which our learners spend their time in real life.

The learning situations were to take place in a car dealership. And so our task now was to transfer different vehicle models into our learning world.

1.5.1 From the Maya Model to the Real-Time Model with Texture

The challenge was to scale down the Maya model with a number of about 4 million polygons to a Maya model with about 10,000 polygons, so that we can display high-quality models on a tablet.

The result was impressive for us. The two images below show the resulting real-time model with texture.

Figure 1.4 Maya model real-time

1.5.2 The Architecture

In addition to the vehicles, we designed the architecture of the Audi Learning Valley. A digital car dealership was created as a learning environment.

The blueprint here was the architectural plans of an Audi dealership as it really was in reality.

As with the avatars, the vehicle models, and also here with the architecture, it was important to us to make the environment and context as realistic as possible for our learners.

Here, too, we learned a lot from the gaming world.

> The more realistic the digital world is presented, the more "serious" the game is. And the more "serious" the game, the greater the identification of the learners with the learning context.

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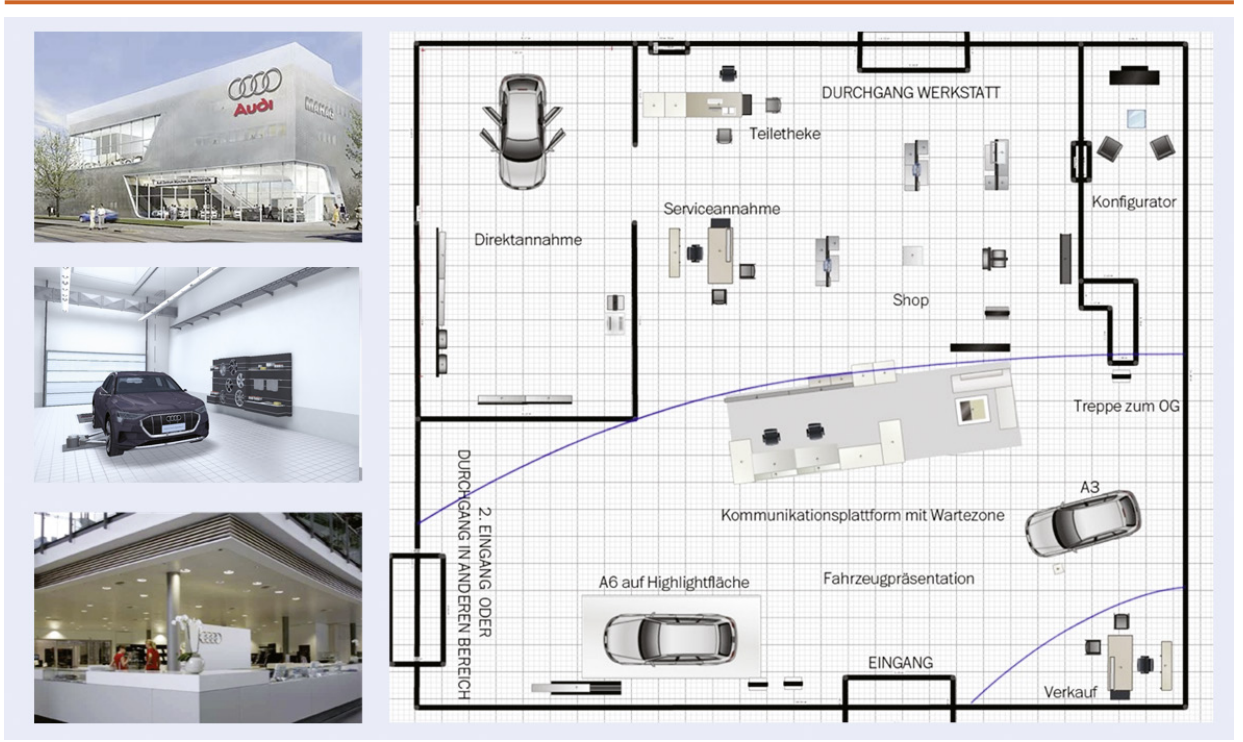
Figure 1.5 Architecture

Figure 1.6 The car dealership in the 3D learning world ambience

1.6 Learning Content with Gamification

Audi Learning Valley had opened up some pioneering work up to this point, steering us into new spheres and meanwhile evolving towards an iterative research project for a new digital learning format as a prototype. With the realization of the 3D graphics, the modeling of the 3D environment, the 3D vehicle models as low poly models and the photorealistic avatars we now about to enter into areas where we could feel at home – we thought: Learning content development.

Our goal with Audi Learning Valley was to offer our learners something that could realistically depict the challenges of their everyday working lives via a simulation, that would allow the learners themselves to intervene and shape the scenarios as interactively as possible at any time, and that would remain exciting, fun and inviting to the free exploration of new approaches.

The next thing we realized was that we could once again draw on proven experience in the games industry and work with the methodology of gamification to support motivation and fun in explorative learning scenarios.

What Is Gamification?

Gamification, derived from the English word "game" for play and can also be translated literally as game-fication.

Games seem to have always fascinated people in our society, captivating them and making them spend a lot of time with them. It is striking to what extent attention and time are spent on computer games, in particular. Players of the computer game "World of Warcraft", for example, spent around 5.93 million years playing the game.[1]

According to findings from studies at the Institute for the Future, a game fulfills four relevant characteristics in order to exert its fascination on users:

1. A clear goal to be achieved
2. Rules that set a framework of possibilities for the game experience
3. Feedback, which helps to experience whether an action was good or bad
4. Voluntariness[2]

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[1] Vgl. McGonigal, Jane; Gaspar, Martina: Besser als die Wirklichkeit! Warum wir von Computerspielen profitieren und wie sie die Welt verändern. München: Heyne Verlag, 2012, p. 73
[2] Vgl. Deterding, Sebastian; Dixon, Dan; Khaled, Rilla; Nacke, Lennart: From game design elements to gamefulness: defining gamification. In: Proc 15th MindTrek conference 2011, Tampere, p. 9–15

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