Meet TIME
An update on the Research Area TIME
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Dear readers,

A number of years have passed since the last edition of our ‘TIME Book’. We are happy to look back on productive, challenging, and exciting years and want to use this opportunity to bring our colleagues, our partners, and our students up-to-date on our activities. After a short overview of the Research Area, we showcase some of the highlights in the fields of research and teaching.

We have published a number of articles in prestigious scientific journals and launched new research projects, which are located at the interface between economics, engineering and natural sciences. In the area of teaching, we were excited to launch our very own Master program – the MME-TIME – that is aimed at allowing students to become true technology leaders.

But most importantly: Our team has grown again! Dr. David Antons, who has been with the Research Area TIME for a number of years, turned down offers for full professorships, instead choosing to remain with us on a long-term basis as co-director of the Innovation, Strategy, and Organization (ISO) Group and the Research Area TIME.

We will present these and further activities on the following pages in detail. We hope to have aroused your interest and hope to hear from you.

David Antons, Malte Brettel, Christian Hopp, Stefanie Paluch, Frank Piller, Torsten-Oliver Salge, Daniel Wentzel
(from left to right)

Aachen, August 2018
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The Research Area TIME
Facts & Figures 2017

The Research Area ‘Technology, Innovation, Marketing & Entrepreneurship’, briefly TIME, was founded in 2012. The initiative arose from the Excellence Initiative at the RWTH Aachen University, which has also led to a reorientation of the School of Business and Economics. The Research Area consists of the chairs and professorships of Dr. Antons, Professor Brettel, Professor Hopp, Professor Paluch, Professor Piller, Professor Salge and Professor Wentzel.

The Research Area TIME is at the center of the vision of an integrated, technological university and offers many opportunities for interdisciplinary cooperation. Together, the members of the Research Area are pursuing an ambitious research and teaching program with a clear focus on the conception, development and commercialization of technological innovations.

The aim is to provide students, scientists and practitioners with valuable evidence-based insights into the conception, development, design, commercialization and continuous improvement of new products, services and business models within established organizations and new ventures.

Thanks to an inspiring work and learning environment, new answers and solutions to the most important challenges in research and society as a whole can be found. The Research Area TIME maintains close links with leading research institutes and companies and conducts joint research projects.

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Number of theses

- Distinct courses: 48
- FT-50-publications: 35
- External PhD students: 8
- Team assistants: 5
- External funds: 4.02 Million €
- Accumulated citations*: 20,408
- Associated professors: 8
- Post-Docs: 9
- Professor Salge: 1
- External PhD students: 8
- 112 Scientific staff members

* in Google Scholar
The Research Area TIME is part of the School of Business and Economics at RWTH Aachen University. Since its inception, business and economics have played an important role at RWTH Aachen University. In the year of its foundation in 1870, the university established an extraordinary chair for national economics and business management. The independent School of Business and Economics was founded in 1986 and has been growing ever since.

Research questions of global relevance can only be solved through interdisciplinary cooperation. Therefore, the School of Business and Economics focuses on interdisciplinary topics which are positioned at the interface between management, engineering and natural sciences. As part of this effort, four Research Areas have been established, which reflect the strong internal centers of excellence deeply integrated into the wider university. Research areas and the embedded interdisciplinary networks enable students to approach problems from different perspectives at an early stage. As a result, the School has built an international reputation for excellence in research and teaching at the intersection of management and technology.

In April 2011, the School received the accreditation of the Association to Advance Collegiate Schools of Business (AACSB). In Germany, only eight business schools or schools of economics carry the accreditation of AACSB.
Meet the professors

David Antons
Innovation, Strategy and Organization (ISO)

David Antons, born in 1983, has management responsibility (Associate Professor, equiv.) for the Chair of Innovation, Strategy and Organization since September 2017, after having turned down offers for professorships at the universities of Bochum and Mainz. David Antons studied business administration at RWTH Aachen University and Chulalongkorn University, Bangkok. He received his doctoral degree in technology and innovation management in 2013 and finished his post-doctoral Habilitation degree at RWTH Aachen University in May 2018. During the last years, he conducted several research projects in cooperation with companies of different industries (e.g. engineering, automobile, financial services, healthcare). He attended the Universities of Cambridge and Melbourne as a visiting scholar.

Research interests: Organizational reputation; technology and knowledge transfer; learning from feedback; decision-making behavior; text mining

Christian Hopp
Technology Entrepreneurship (TEN)

Christian Hopp studied business administration at universities in Germany, the Netherlands, and the United States. He holds a doctoral degree (Dr. rer. pol.) in quantitative economics and finance from the University of Konstanz, a Master in business administration from the University of Pittsburgh, USA, and a Master in financial management from the Rotterdam School of Management, the Netherlands. Prior to joining RWTH Aachen University in August 2013, he was an Assistant Professor at the University of Vienna, Austria. His research encompasses various areas ranging from venture capital financing, human resource management, to entrepreneurship.

Research interests: Entrepreneurship and new venture emergence; entrepreneurial founding processes; business planning and entrepreneurial financing; venture capital financing and syndication

Malte Brettel
Innovation and Entrepreneurship (WIN)

Malte Brettel was born in 1967. He holds a degree in engineering and business administration from the Technical University of Darmstadt. In 1996, he received a doctoral degree and, in 2003, a post-doctoral Habilitation degree from the WHU Koblenz. Since 2003, Malte Brettel has been professor of business administration and entrepreneurship at RWTH Aachen University. He is co-founder of a successful e-commerce start-up, where he also acted as managing director. In addition to founding several businesses, he has extensive practical experience as a consultant, both for start-up firms and for established companies like Porsche AG and Deutsche Post AG.

Research interests: General entrepreneurship; corporate entrepreneurship; entrepreneurial finance and controlling; entrepreneurial marketing

Stefanie Paluch
Service and Technology Marketing (STM)

Stefanie Paluch studied business administration at TU Dortmund University and at the Ceram Business School in France. For her dissertation entitled ‘Customer Perception of Remote Service Technologies’, Stefanie Paluch received the dissertation award in 2011 by TU Dortmund University. Prior to joining RWTH Aachen University, Stefanie Paluch was an Interim Professor for innovation and technology management, 2013 to 2014, and an Assistant Professor for service and technology management, 2012 to 2014, both at the Faculty of Economics, Business Administration and Social Sciences at TU Dortmund University. Stefanie Paluch received the Rudolf-Chaudoire Award for outstanding research achievements.

Research interests: Acceptance of technology-based services (remote services/Smart technologies); marketing of innovative services and new technologies
Frank Piller
Technology and Innovation Management (TIM)

Frank Piller graduated with a PhD in operations management from the University of Würzburg in 1999 and habilitated at the TUM Business School in 2004. He has headed the TIM Group at RWTH Aachen University since 2007. Earlier, he worked at the MIT Sloan School of Management and was an Assistant Professor of management at the TUM Business School (1999-2004). Frank Piller has worked as a consultant for many international companies, including several DAX30 and Fortune 500 corporations. As a member of their board of scientific advisors, he works with a number of innovative technology companies to bring his research into practice. He also is a co-founder of the MIT Smart Customization Group, Massachusetts Institute of Technology, USA.

Research Interests: Innovation interfaces (open innovation and co-creation); strategies for managing disruptive innovation; technology transfer and technology acquisition

Torsten-Oliver Salge
Innovation, Strategy and Organization (ISO)

Torsten-Oliver Salge studied business administration at universities in Germany, France, Italy and England. He holds a PhD and a M.Phil. degree, both from the University of Cambridge. Prior to joining RWTH Aachen University in April 2013, he was an Interim Professor at the University of Duisburg-Essen, 2012 to 2013, a Junior Professor at the University of Bochum, 2009 to 2012, and a post-doctoral research associate at the University of Cambridge, 2009. He has held visiting scholar appointments at universities in Auckland, Buenos Aires, Cambridge, Oxford and Philadelphia. As part of his research program, he has collaborated with a number of organizations from sectors such as health-care, public services and financial services.

Research Interests: Collaboration across organizational and institutional boundaries; strategic HRM and employee well-being; technology legitimation; adoption and payoff

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Daniel Wentzel
Marketing (MAR)

Daniel Wentzel was born in Bonn in 1978. He has held the Chair of Marketing in the School of Business and Economics at RWTH Aachen University since spring 2011. Daniel Wentzel studied business administration at the University of Cologne and the University of Auckland, New Zealand. In 2008, he received his doctoral degree from the University of St. Gallen, Switzerland. From 2008 to 2011, he worked as an Assistant Professor at that university and received his post-doctoral Habilitation degree in 2010. As part of his research program, he has worked together with many companies from the automobile, retailing, and financial services industries.

Research Interests: Consumer behavior; consumer acceptance and adoption of innovations; product design; service and brand management

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Appointment

Post-doc accepts new Assistant Professorship in Tucson (USA)

In 2017, Oliver Schilke, PhD and post-doctoral researcher at the Research Area TIME, was appointed as Assistant Professor by the University of Arizona in Tucson (USA). We would like to congratulate him on this achievement and wish him much luck!

In 2017, Oliver Schilke completed his postdoctoral lecture qualification (‘Habilitation’) focusing on trust building at the Innovation and Entrepreneurship Group (WIN). He is an Assistant Professor in the Management and Organizations Department and an Assistant Professor (by courtesy) in the School of Sociology at the University of Arizona in Tucson (USA). His research focuses on trust, organizational routines/capabilities, and interorganizational relationships. Oliver Schilke previously received a PhD in sociology at the University of California, Los Angeles (USA) and completed his doctorate in business administration majoring in strategic management at Witten Herdecke University (Germany). He completed his studies of business administration with majors in strategic management and finance at the University of Siegen (Germany) and HHL Leipzig Graduate School of Management (Germany).
Research at the Research Area TIME

Our research philosophy

Research activities at the Research Area TIME pursue the common objective of generating new evidence-based findings on fundamental research questions in the areas of technology and innovation management, marketing, and entrepreneurship. We adopt an integrative methodological approach (mixed methods). This allows us to benefit from the complementary nature of quantitative, qualitative and experimental methods to obtain a holistic assessment of our research questions.

Application-orientated, third-party funded research complements our basic research activities that seek to push the knowledge frontier in our discipline and regularly lead to publications in leading international journals. Furthermore, our special concern is to ensure that the results of our research are transferred into practice. Therefore, the members of the Research Area TIME are involved in research cooperations with companies and other research institutes.

The entrepreneurship center, headed by Professor Brettel, also constitutes an important vehicle for knowledge transfer at the Research Area TIME and RWTH Aachen University more generally. Its main objective is to make the prospect of founding a technology-based start-up more attractive among students and scientists at RWTH Aachen University and support them on their way from the initial idea to the successful business launch.

Research Highlights in 2016 and 2017

Our publications .......................................................... page 16

Interdisciplinary research projects ....................................... page 24
Current research projects of the Research Area TIME examine features of successful entrepreneurs as well as starting solutions to reduce decision complexity in B2B-settings and are promoted by well-known institutions.

Introducing ‘Innovative Tuesdays’ ........................................ page 26
In October 2017, a new networking format started in cooperation with the Chamber of Industry and Commerce (IHK) Aachen. This event series brings together local companies, researchers, and students to stimulate new ideas and discuss different perspectives on innovation management.

The Center for Technology Transfer and Entrepreneurship .......... page 27
The Center supports spin-offs from RWTH Aachen University in getting ready for the market.
A study by Prof. Brettel investigates the relevance of innovation and marketing in the share repurchase era

listed firms in the USA increasingly buy back their own shares from the stock market to boost their stock price. An investigation by Prof. Malte Brettel and his TIME colleagues Dr. David Bendig, Dr. Daniel Willmann, and Dr. Steffen Strese analyzes how the co-occurrence of share repurchases and budget cuts in innovation and marketing affects firm stakeholders such as investors and consumers.

“Firms focusing on share repurchases offer more flawed products to consumers.”

The results of the study indicate that there is a higher share of firms cutting marketing and research and development (R&D) investments among repurchasing firms than among non-repurchasing firms. However, when firms engage in such budget cuts and share repurchases at the same time, investors respond negatively at the stock market. Shareholders seem to be aware of the potential for long-term value generation through product innovations. An additional analysis of product recalls of defective and potentially harmful products illuminates the consequences of this investment policy from a consumer perspective. Firms focusing on share repurchases or budget cuts in marketing and R&D offer more flawed products to consumers. The results underscore that investor pressure can set wrong incentives, which may lead to dangerous side effects for consumers.

Citation:

Prof. Brettel: Defend your research
Four questions to Malte Brettel and David Bendig on share repurchases

Your study concentrates on share repurchases. Why do you as entrepreneurship and innovation scholars particularly look at such a financial measure?
Prof. Brettel: Share repurchases have become the number 1 payout instrument in the USA and are also gaining popularity in Germany again. Since buybacks require tremendous resources, the topic is relevant for all functional areas. Interestingly, research on repurchases that goes beyond finance is scant. We, hence, wanted to understand what share repurchases may imply for innovation management and the consumer.

What would you recommend to firms based on your study?
Prof. Brettel: When there are good reasons for a share repurchase, they should be clearly communicated to investors. Different to initial public offerings, comprehensive information packages for investors are currently rare for repurchase programs. Additional reports can accentuate that innovativeness and product quality are not neglected.

Your study also investigates implications for product safety. Where do firms need to catch up regarding consumer protection?
Dr. Bendig: Top management compensation of listed firms usually comprises stock-based components. Yet, human and economic harm through flawed products are hardly integrated into performance-based compensation. Delayed payments that are linked to long-term product safety or contract penalties may be potential solutions to align managerial and consumer interests.

"Firms focusing on share repurchases offer more flawed products to consumers."
A study by Dr. Antons and Prof. Salge examines the role of newness in research

How much is newness, understood as the initial exploration of a new topic, valued in management research? This is a question of great relevance for any researcher, and even more so for innovation researchers such as David Antons, Oliver Salge (both Research Area TIME) and Amol Joshi from Oregon State University.

To address this question, the authors drew on 1,646 full-text journal articles from the field of strategy that comprised nearly 18 million words and jointly generated more than 170,000 citations over 35 years. A text mining technique known as topic modelling allowed them to identify the topics discussed in these articles and to develop a measure of topic newness that captures the extent to which the topics covered in an article are new to the field. It was then through econometric analyses that they could link an article’s topic newness to the number of times it was subsequently cited. Importantly, the authors found that the first two articles published on a new topic each generated a citation premium of more than 100%, which is even stronger within the field of the respective article than outside. Moreover, the citation premium generated by introducing a new topic was stronger the more salient this topic was in the respective article and the more the authors attempted to connect it to established knowledge in the field.

“These results are truly encouraging for all researchers who would like to break new ground, but have been discouraged so far by the considerable risks and uncertain rewards associated with such aspirations.”

They now know that being among the first to explore a topic in their field is likely to roughly double the impact of their research. Despite the persistence required, venturing out and uncovering new research territory can hence be rewarding in tangible ways.

Citation:

Prof. Salge: Defend your research
Three questions to David Antons and Oliver Salge on text mining

What is text mining?
Dr. Antons: Broadly speaking, text mining is a set of computational techniques to process and analyze textual data as a form of unstructured data that has traditionally been difficult to unpack by means other than manual analysis. We typically distinguish between supervised and unsupervised text mining algorithms. In simple terms, supervised techniques need additional information about the text to be investigated, while unsupervised techniques work only with the text at hand.

What are possible applications in practice?
Dr. Antons: Text mining has the potential to become a key element of organizations’ big data toolbox. It allows organizations to extract insights from large text corpora such as scientific texts, patent applications, product announcements or (social) media contributions that are simply too big to analyze manually. This promises to facilitate a range of critical managerial activities ranging from knowledge search and knowledge sharing to innovation measurement and reputation management.

What are possible applications in research?
Prof. Salge: Text mining opens up entirely new and truly exciting research avenues. A case in point is our novel measure of topic newness described in this booklet. In other studies, we have computed the topic landscape for individual journals such as JPM or entire scientific fields such as research on disruptive innovation and have traced the evolution of the public debate on data privacy as reflected in the press. It has also triggered a special issue on disruptive innovation we have edited for the Journal of Product Innovation Management.
Professors Piller and Blazevic look into the dark side of online co-creation

When the UK Natural Environment Council invited the public to name a £200m vessel in 2016, suggestions flooded in, including the patently ridiculous, and overwhelming favorite, Boaty McBoatface. The then-science minister Jo Johnson was forced to intervene – to bring the seriousness back to the case. A study by the Research Area TIME suggests that this incident is no exception, but a regular pattern in online ideation contests.

Using the power of the crowd to generate input for the innovation process provides access to new knowledge and reveals latent consumer needs. But it also is risky, as firms give up control to an unknown crowd. Some contestants post content that is unintended and unwanted by contest hosts. In their research, also recognized by the prestigious PDMA Research Award, Alexandra Gatzweiler, a doctoral researcher at the Research Area TIME and innovation manager at Ford Motor Company, Vera Blazevic, permanent visiting professor and a Professor of marketing at Radboud University Nijmegen, and Professor Frank Piller investigate this so-called deviant co-creation.

Their study provides the first theoretical foundation of deviant co-creation and empirically illustrates its various patterns: content, ranging from destructive to constructive. Deviant content usually bewilders evaluators and draws their attention to the content. Destructive deviant content may trigger visible and malicious protests or result in mocking and ridicule on the contest platform and other social media, thereby exposing the contest host to reputational risks. Constructive deviant content can lead to positive discussions in comment sections and other social media outlets, as well as foster further development of an initial idea, thereby contributing to the firm’s innovation potential.

This study has opened a new stream of crowdsourcing research and provides managers with a deeper understanding of deviant content, raising awareness for the dark side risks as well as indicating how to leverage them to achieve constructive co-creation.

How did you come up with the idea to study deviant consumers in crowdsourcing?
The topic arose based on consumers’ crowdsourcing ideas for an ideation contest hosted by one of our TIMEX community members (a community of managers working with the Research Area TIME on innovation and technology management). One member shared the experience of a packaging contest for a dishwashing liquid brand that ended in a disaster and even became national news when the company refused to produce the winning contribution: Liquid with chicken flavor. We interviewed the user contributing this idea and learned about the many facets behind this behavior.

But is this not just a minor phenomenon?
No, on the contrary. In our Netnography study of more than 40 online ideation campaigns, we found deviant content in almost every contest. But the literature only discussed the benefits of user ideas for a firm’s innovation process. We wanted to provide a richer picture.

What does your research recommend to managers?
Three simple things: First, take crowdsourcing seriously! An ideation contest is not a software platform to be outsourced to an agency. Have a budget and your own capacity for community management. Second, be prepared for creative deviant consumers – what can happen will happen. And embrace it! In the end, if no one even cares to joke about your theme, then it probably is totally irrelevant to consumers. Third, use deviant content as a creativity impulse. It is the salt in the crowdsourcing soup – and by working on these ideas, often great concepts come up.

Citation:

Prof. Piller: Defend your research
Three questions to Frank Piller about deviant consumers in crowdsourcing
I f you ever considered establishing a start-up through a crowdfunding website, most likely you will have heard that having a product video is crucial for you to get recognized. But what other factors predict entrepreneurial success? Sourcing from Kickstarter data, the world’s largest reward-based crowdfunding website, this recent research employs neural networks to identify features of successful entrepreneurs. Using most recent techniques in natural language processing and unsupervised learning algorithms on more than 30,000 technology-focused projects with text, speech and video data, the findings are able to predict a startup’s success. 

Also, a large body of empirical research has shown that so-called ‘lead users’ and not manufacturers are the source of many functional-novel products and services. Novel search and machine learning algorithms are applied to develop an automated approach to identify lead users and the inventions they make. Moreover, it is shown that they communicate their idea and product in semantically distinct ways. The project results were presented at the 2017 Conference on Human Factors in Computing Systems and at the Kickstarter headquarters in New York. The work was supported by beta access to Google Cloud machine learning services and an RWTH-ICT grant. Together with the Fraunhofer-IMW and the University of Cologne, the research group received a BMBF research grant for exploring the effectiveness of crowdfunding as a financing vehicle for scientific spin-offs.

The researchers also established an interdisciplinary Aachen Machine Learning Meetup forum for scientists at RWTH Aachen University. During two-hour meetings, students, doctoral students and start-up founders present most recent research in the field, or examples of applications in the field. Colleagues are cordially invited to get in touch and join the meetup.

“Some point, every consumer has had the experience of standing in front of a supermarket shelf, unable to come to a decision about which particular jar of jam to select from the many different brands on offer and becoming increasingly frustrated. While this situation might sound like a simple anecdote from daily life, it has in fact been empirically investigated and traced back to the so-called ‘choice overload phenomenon’.

While this phenomenon has been investigated extensively in a business-to-consumer (B2C) context, studies in business-to-business (B2B) settings – especially with engineer-to-order (E2O) companies, which are characterized by high degrees of complexity – are largely missing. This is surprising, since B2B companies normally have to face high heterogeneity in customer demand, and thus have to differentiate their products accordingly. This high degree of individual customer product differentiation leads to an increase in the diversity of variants and, from a company’s perspective, to high internal complexity. Accordingly, companies are faced with two major challenges: On the one hand, they have to decrease this variant-induced complexity (e.g. production costs). On the other hand, a high complexity with the offered variants can induce customer choice overload, leading to unsatisfied customers.

In order to efficiently reduce both production and customer complexity, a method will be developed to efficiently translate individual customer demand into product architectures. In a research project, which will be financed by the ‘Deutsche Forschungsgemeinschaft’ (DFG), the Chair of Marketing (MAR) and the Laboratory for Machine Tools and Production Engineering (WZL), both at RWTH Aachen University, will be pursuing this goal for the next two years by introducing ‘Customer Starting Solutions’ to the B2B context of E2O companies, i.e. individualized first product offers which customers can then step-by-step adjust.
Introducing ‘Innovative Tuesdays’

A networking event series brings together local companies, researchers, and students

In October 2017, the new networking format ‘Innovative Tuesdays’ started in cooperation with the Chamber of Industry and Commerce (IHK) Aachen. This event series serves as a networking platform bringing together local companies, researchers, and students to stimulate new ideas and discuss different perspectives on innovation management. On every second and fourth Tuesday evening, the hosts Thomas Wendland (IHK), Prof. Stefanie Paluch, and Prof. Frank Piller (RWTH) welcome all those interested in technology and innovation management at the RWTH Campus.

In the first term, eight exciting discussions were hosted. For example, the story of a medium-sized local software company transforming into a solution seller by offering digital services was witnessed, and an in-depth insight into the innovation system in the field of automotive lighting was provided. Other speakers addressed the frontend of innovation, market research for digital innovations, latest strategies in managing intellectual property, and much more. A networking reception after the events allows participants to further tighten the bonds and to talk about possible joint projects.

All events are held in English to promote the exchange even beyond national borders and involve the international students of RWTH Aachen University. We are looking forward to welcoming you at our next Innovative Tuesdays.

Further information can be found here: www.time.rwth-aachen.de/cms/TIME/Wirtschaft/inhalt/~qcxu/Innovative-Tuesday/

In 2017, the RWTH Center for Technology Transfer and Entrepreneurship (TGZ) continued their track record in successful spin-offs. As part of the start-up support program EXIST of the German Federal Ministry for Economic Affairs and Energy (BMWi), 12 Business Start-up Grants and four Transfer of Research Grants were approved that the TGZ had coached and supported during the application process. In total, this implies public grant funds of more than 4 million Euro for Aachen. RWTH Aachen University hence remains among the leading entrepreneurial universities in Germany.

Two striking examples for innovative RWTH spin-offs are Adhesys Medical GmbH and Medical Magnesium GmbH – both coached by the TGZ. Adhesys Medical develops next generation surgical sealants. Founded in November 2013 by Dr. Heike Heckroth, Prof. René Tolba, Prof. Brettel (President of TGZ) and Marius Rosenberg, Adhesys Medical in April 2014 won the Rice Business Plan Competition in Houston, Texas, the world’s largest business plan competition. In April 2017, Adhesys Medical was sold to Aachen-based Grünenthal Group. Medical Magnesium develops novel implants made from magnesium and was founded in 2015 by RWTH alumni Florian Coppers, Kilian Reuß, Alexander Koop and Christoph Ploock. They, too, remarkably succeeded at Rice and won the third place in April 2017 as sole European participants in the competition.

Moreover, TGZ acts as co-founder and close partner of the digitalHUB Aachen. The digitalHUB was initiated by key representatives and institutions from regional Mittelstand, academia and politics, and was co-financed with the State NRW. Digital users from industry, digital start-ups and IT Mittelstand as well as regional academia meet at the DIGITAL CHURCH to develop start-ups, joint ventures and cooperations. TGZ and digitalHUB work hand in hand to realize new digital business models in start-ups and Mittelstand. The startlab, TGZ’s IT incubator, moved into the church for this purpose. A tangible outcome of our joint efforts is Aachen’s recent designation as one of five Digital Model Regions by the State NRW.

For further information, please refer to http://www.gruenderzentrum.rwth-aachen.de/
In 2017, 14 PhD students of the Research Area TIME completed their doctorate. We congratulate them on their success and wish them all the best for their future!

In the following, two of these dissertations will be outlined as representatives for all completed dissertations.

Dr. Patrick Pollok:
Three Essays on Crowdsourcing for Technical Problem Solving

Today, many crowdsourcing initiatives are governed by specialized intermediaries who provide internet-enabled communication infrastructure and help clients gain access to the knowledge and creative potential of large populations of external contributors. While prior research has mainly focused on crowdsourcing of ideas and needs-related knowledge from users and customers, only little work has been done on crowdsourcing for technology-related solutions to innovation problems from professional solvers. The objective of this dissertation is to examine how crowdsourcing as a problem-solving approach in innovation can be implemented, developed into an organizational capability, and effectively applied at the project level in knowledge seeking firms. A mix of qualitative and quantitative research methods is used to address these questions in a series of three independent research papers.

Dr. Patrick Cichy:
Essays on Privacy in the Digital Age

The increasing ability to capture and consume digital data fuel service and business model innovation in almost every industry. Despite its potential, the commercial exploitation of the ‘oil of the digital age’ is socially contested and lacks individual acceptance. This is because associated organizational practices violate individuals’ expectations of privacy and give rise to various issues around cybersecurity. It is this very tension that motivated the systematic exploration of opportunities and challenges associated with creating value from data. The resulting PhD thesis provides valuable insights for the design, diffusion and governance of data-enabled services and business models.

Dr. Volker Bilgram:
Understanding the Crowd – How to Construct the Crowd and Manage Participants in Customer Co-Creation, supervisor: Frank Piller

Dr. Patrick Cichy:
Essays on Privacy in the Digital Age, supervisor: Torsten-Oliver Salge

Dr. Denise Fischer:
Triple-Bottom-Line-Based Motivation in Entrepreneurship, supervisor: Malte Brettel

Dr. Robert Grüsschow:
Understanding Retailer Payment Transaction Costs in B2C E-Commerce, supervisor: Malte Brettel

Dr. Heinrich Matthies:
Determinants of Product Return Behavior in Fashion E-commerce, supervisor: Malte Brettel

Dr. Patrick Pollok:
Three Essays on Crowdsourcing for Technical Problem Solving, supervisor: Frank Piller

Dr. Juliette Reiss:
Die Beurteilung von Energieinformationen durch Konsumenten: Kontexteffekte und ihre Moderatoren, supervisor: Hartwig Steffenhagen

Dr. Stefan Scheuffelen:
Evaluating Different Types of Segmentation Bases Towards their Link to Consumer Behavior in E-Commerce, supervisor: Malte Brettel

Dr. Till von den Driesch:
Toward a Better Understanding of Dynamic Capabilities: Exploring and Validating Dynamic Bundles, supervisor: Malte Brettel

Dr. Daniel Willmann:
Myopic Marketing and R&D Management in the Context of Corporate Financing: An Empirical Investigation of Manifestations and Consequences, supervisor: Malte Brettel

Dr. Johann-Peter Wulf:

Dr. Henrik Matthies:
Determinants of Product Return Behavior in Fashion E-commerce, supervisor: Malte Brettel
Teaching at the Research Area TIME

Our teaching philosophy

Members of the Research Area TIME are involved in various Bachelor and Master programs of RWTH Aachen University and set great emphasis on a high quality of teaching. Our courses are research-oriented, interactive and mainly taught in English. This way, students are offered many opportunities for exchange among themselves and with the lecturers, realized for instance through case study discussions, presentations, debates or project activities.

“Our courses are research-oriented, interactive and mainly taught in English.”

Given that the Research Area TIME is located at one of the leading technological universities, many courses discuss interdisciplinary issues with connections to engineering and natural sciences. Moreover, students are given the opportunity to get familiar with the range of methods employed by the Research Area and to apply them in research projects. Finally, we are committed to the Executive MBA program of RWTH Aachen University as well as the MME-TIME program offered by the RWTH Aachen Business School. Hence, we offer manifold advanced training options for practitioners in the areas of marketing, technology and innovation management as well as company foundations. Possible formats comprise workshops, seminars or certified courses that allow for the award of a RWTH Aachen certificate after successful completion.

Teaching Highlights in 2016 and 2017

Launching the RWTH Aachen Business School .................................... page 32
In May 2017, the RWTH Aachen Business School was launched, with the aim to provide young graduates with professional experience and managers with future-oriented knowledge tailored to their specific needs.

Launching the MME-TIME ........................................................................ page 34
In 2017, we launched our own Master program – the Master of Management and Engineering in Technology, Innovation, Marketing, and Entrepreneurship (MME-TIME).

Introducing Germany’s first MicroMaster degree ................................ page 35
After the successful implementation of our massive open online courses on the learning platform edX edge, we have introduced an online ‘MicroMaster’ degree alumni can be credited for within traditional RWTH Aachen degrees.

Excursion to the SmartFactory OWL ...................................................... page 38
Students of the course ‘Managing a Tech-Company in a Globalized World’ visited SmartFactory OWL, a research and demonstration platform for the industry 4.0.
On 18 May 2017, RWTH Business School GmbH was officially launched. The new educational institution aims to ensure that managers are optimally prepared for the challenges of the future. These challenges are the result of the increasingly rapid development of technology-driven innovations which are radically changing established industries and their process landscapes.

Frank Piller, professor of innovation management and Founding Dean of the Business School, states: “The managers of tomorrow must understand these developments in order to be able to guide their companies safely through the technological changes.”

To achieve this, the programs must be highly adaptable to suit the needs of individual students. In Aachen, this has been made possible by a concept of personalized study that is unique in Europe and that relies on a blend of traditional teaching methods and state-of-the-art digital learning technologies.

Importantly, ‘Technology’ is more than a buzzword at RWTH Business School. The constantly changing technological environment demands new competence profiles for middle management, and RWTH Aachen University is strongly committed to passing on transforming knowledge. Dr. Helmut Dinger, Managing Director of RWTH Business School, emphasizes: “Our new range of courses is a logical consequence of the technological competence of RWTH Aachen and the necessary transformation of knowledge at all levels.”

Hence, technology plays a key role in the School’s programs. These are geared toward young graduates with initial professional experience but also toward managers with more professional practice.

As of 2017, the Business School offers three degree programs, an Executive Master of Business Administration (EMBA), a Master in Data Analytics and Decision Science (DDS) and a Master in Management and Engineering with a focus on Technology, Innovation, Marketing, and Entrepreneurship (MME-TIME). Members of the Research Area TIME are strongly involved in all programs. In addition, there is a large range of smaller courses and certificate programs that deal with current challenges at the interface of management and technology. The entire Business School curriculum has been developed in close cooperation with the School of Business and Economics at RWTH Aachen University.

Students at RWTH Business School are trained right at the heart of top university research: in the Production Technology Cluster on the RWTH Aachen University campus. With 16 research clusters over an area of 800,000 square meters, one of Europe’s largest technology-oriented research landscapes is growing at RWTH Aachen University. This provides ideal conditions to implement the desired combination of management and technology. Here, new technological approaches such as Industry 4.0 can be ‘tried out’ and therefore understood better.

“Some business schools have a ‘T’ for Technology in their names. We have it in the building,” emphasizes Professor Malte Brettel, professor of entrepreneurship and Vice-Rector for Industry and Business Relations at RWTH Aachen University.

For further information, please refer to https://www.business-school.rwth-aachen.de/en/
Launching the MME-TIME
Our very own Master program

In 2017, the Research Area TIME launched its own Master program – the Master of Management and Engineering in Technology, Innovation, Marketing, and Entrepreneurship (MME-TIME). The program is delivered in partnership with Cambridge Digital Innovation (CDI) at Hughes Hall, University of Cambridge. Designed for young professionals with a STEM background, the MME-TIME provides students with the skills and tools needed to succeed in the digitized economy.

In the course of the program, students learn about the latest developments in laser technologies, digital and additive manufacturing, robotics, big data technologies, and sustainable energy technologies. These technological modules are accompanied by a profound management education where students learn how to leverage and commercialize these technologies successfully. Hence, the aim of the program is to equip graduates with an interdisciplinary mindset that will allow them to tackle complex challenges in their industries.

A truly unique characteristic of the program is the opportunity to study in two different tracks. In the residential track, students complete the program on-campus in Aachen. In the distance learning track, students have the opportunity to complete the program mainly from their home location, allowing them to keep working while also attaining a new set of skills. Both tracks are based on the latest blended learning technologies where digital techniques and tools are combined with interactive and participant-centered sessions to deliver an optimal learning experience.

The innovative curriculum and blended learning concept of the program has been awarded by the renowned German Stifterverband.

Further information can be obtained from https://www.academy.rwth-aachen.de/en/mme-time

Introducing Germany’s first MicroMaster degree
Our innovative approach to massive open online teaching

’SManaging Technology & Innovation: How to deal with disruptive change’ launched on edX

Since its foundation in 2014, internationally renowned universities such as Harvard, MIT, and the Sorbonne have used the online learning platform edX to diffuse their academic content across the globe. As Germany’s first chartered edX member, the Research Area TIME of RWTH Aachen University successfully placed its first Massive Open Online Course (MOOC) ‘Introduction to Venture Capital’ on edX in 2016. More than 12,000 participants did not only make this course a tremendous success but also provided the course team with crucial insights regarding learner preferences and various best practices that have since been leveraged for the creation of additional online content.

Based on the success of this initial offering, RWTH Aachen is now the first German university to develop a MicroMasters program, a new online format that recently started on edX. The newly created MicroMasters program ‘Managing Technology & Innovation: How to deal with disruptive change’ is a collaboration of various Chairs of the Research Area TIME and consists of multiple Master courses, exams and a thereof resulting MicroMasters degree. Participants can pursue this degree completely online and can then, upon completion, leverage it as part of a fully-funded Master’s degree at RWTH Aachen University.

“It allows them to pursue a high-quality education during full-time employment and to familiarize themselves with the academic environment of the RWTH Aachen University – at their own pace, from their desk, without great financial commitment”, Malte Brettel, professor of Research Area TIME’s WIN chair, explains.

Online learning, a phenomenon that emerged only recently, is currently still in its infancy stage – RWTH Aachen’s Research Area TIME is committed to maintaining its position as a thought leader in this promising field in the years to come.

“The MicroMasters program is the perfect opportunity for participants to reach the next level in their career.”
Courses of the Research Area TIME
In Detail: B2B Marketing for Master students

At the core, the courses of the Research Area TIME deal with the conception and commercialization of technological innovations in business-to-business (B2B) and business-to-consumer (B2C) contexts. Thereby, we focus on interactive and student-centered teaching formats. In the following, the module ‘B2B Marketing’ will be introduced as a representative for all courses.

While the focus of many marketing programs is on business-to-consumer (B2C) companies, a majority of companies can be classified as business-to-business (B2B). From a marketing perspective, numerous B2B companies (e.g. Google, Microsoft, IBM, or Intel) belong to the top 20 of the world’s most valuable brands (Forbes 2017) and chances are high that marketing graduates obtain their initial job in a B2B setting. Thus, understanding the mechanisms of B2B buyer-supplier interactions is crucial for students to make informed management decisions in the modern competitive landscape. These challenges along with other nuances of a competitive B2B environment are analyzed and assessed in the advanced master-level module ‘Business-to-Business Marketing’ held by Professor Stefanie Paluch. It applies a variety of different learning approaches to provide the students with a holistic, yet comprehensive view of B2B markets in theory and practice.

Divided into different sessions, the lectures of the course cover the essential conceptual underpinnings of business-to-business relations, such as organizational buying behavior and business marketing communications. The conceptual framework of the lecture is supported by case study work and group presentations adding a considerable orientation to practice. This orientation is also reflected in practitioner sessions, where managers from local and global companies join the class to provide insights from corporate practice.

Ultimately, students are encouraged to deepen their understanding of the B2B environment by pro-actively engaging in the interactive exercise session that complements the lecture session. Based on fundamentals of business-to-business marketing, students will implement their knowledge and skills in an online simulation game developed at and provided by Harvard Business School. Acting as CEO of a company manufacturing motors used in medical devices, students make a variety of marketing management decisions over a period of several years. Students learn to analyze markets and customer segments, allocate resources for marketing communication and research, set prices and work on improving customer loyalty with the ultimate goal to achieve sustainable revenue and maximize profits for their company. The simulation focuses on the link between strategy formulation and execution, requiring students to recall conceptual frameworks and to actively apply them when facing real-world challenges.

In addition to mere knowledge transfer, this advanced marketing course endeavors to further develop and strengthen different individual competencies, such as working in a team. Participants also acquire problem-solving competencies by processing relevant information necessary for complex decision making. Managing the company in a competitive business environment implies direct and indirect feedback on managers’ decisions. In debriefing sessions, students learn to reflect their previous decisions and critical thinking is stimulated. During regular meetings, students present their company, decisions and strategies in different ways (presentation or poster sessions) and thus advance their presentation and communication skills.

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The diverse and exciting structure and combination of different learning approaches also appeals to the approximately 40 students attending this module every year. This is reflected by the numerous comments that students give on the evaluation grids as well as by personal e-mails and notes highlighting the innovative approach to teaching and learning applied in this module.

Students’ feedback on the format of the course and its practical orientation:

“I especially liked the case study group works and the poster presentation session. The conceptualization of the format is unique, and it was fun to practice group work and new forms of presenting an outcome.”

“The simulation offers an exciting new approach compared to exercise sessions in other modules, it is a completely new experience and practically oriented.”

Taught entirely in English, this module is suitable for both domestic students and the increasing number of international students joining RWTH Aachen University each year.
Executive Education
Various interaction formats in the area of Executive Education

We consider it as a task and opportunity to transfer our insights into practice. Consequently, the Research Area TIME contributes to RWTH Aachen’s training programs in various ways.

One of the flagship-programs of RWTH Aachen’s professional training is the Executive MBA (EMBA), which is offered in collaboration with Fraunhofer Academy. Academically managed by Professor Frank Piller, the EMBA provides an extra-occupational general management training for prospective executives with a background in technology or natural sciences, but with a strong focus on technology management, innovative leadership and the management of highly agile processes. Therefore, many of our top engineering colleagues are involved in the program, offering an application-oriented management perspective.

Certified courses offer a short, but intense and scientifically sound introduction into relevant topics. One relevant and very successful example is the course ‘Business Model Innovation’. The course designed by Dr. Lüttgens and Professor Piller gives an introduction into new tools and processes to maintain well-established companies’ success and competitiveness in fast-paced and ever-changing business environments through the consequent, constant and systematic development of new and viable business models. Vice versa, the interaction with participants delivers interesting impulses for the research activities of the Research Area TIME.

Excursion to the SmartFactory OWL
Visiting the industry of the future

For the second time around, the Chair for Service and Technology Marketing had the pleasure to visit the SmartFactory OWL (www.smartfactory-owl.de) in Lemgo. Under the supervision of Professor Stefanie Paluch and Professor Thomas Wittkop, RWTH students met with students of the Hochschule Ostwestfalen Lippe (www.hs-owl.de) to hold the final presentation for the course ‘Managing a Tech-Company in a Globalized World’.

The field trip began with an informative tour through the SmartFactory OWL, which is used as a research and demonstration platform for the industry 4.0. The focus is set on applications for the digital transformation within small and medium sized enterprises. Besides numerous options for 3D printing, research is conducted on implementing augmented reality applications in companies handling production. Especially interesting for all participants of the tour was the modular popcorn production line.

Following the factory tour, the final presentation of all groups started. The setting was similar to a board presentation, where strategies and results of decisions during the simulation game were discussed. Within this simulation game, all groups showed tremendous commitment: Over 54,000 minutes were spent by all participants using the simulation software, which is equivalent to 108 days with 8 hours. Especially the lively discussion between the rivaling groups about tactics, strategies and decisions led to interesting interactions between participants from both universities. The field trip was complemented by an extensive buffet and drink selection for both students and instructors.

The good atmosphere could also not be impacted by the 4.5 hour trip back from Lemgo to Aachen. We would like to thank all participants of both universities for the great cooperation.
Outstanding theses
A short presentation of the best theses in 2017

Data-driven modeling and optimization of last-mile logistics of an e-commerce company in an emerging market

This Master thesis was conducted in cooperation with the Center for Transportation and Logistics (CTL) of MIT and an online retailer acting on the Indian market. The aim was to optimize the cost-intensive last-mile-logistics in Bangalore. The project’s scope was to develop a quantitative model and to validate it based upon real delivery details to evaluate different modes of delivery from an economic perspective. For this purpose, extensive data were consolidated and processed.

Perception of artificial intelligence in service industries – a qualitative empirical investigation

As a general-purpose technology, artificial intelligence has the potential to disrupt service industries. Implemented as chatbots, customers can expect instant responses and better service quality, resulting in higher customer satisfaction – at lower cost. With limited prior research attention, this Master thesis compares service encounters with chatbots and human-mediated chats in a qualitative approach. The findings show that customers have positive dispositions towards implementing chatbots. However, technological limitations impede usefulness and perceived benefits of chatbots. To resolve the observed problems with chatbots, a model combining human intervention with chatbots is proposed.

Effectual thinking: Founders in the academic environment – insights into theory and practice

What decision-making logic do successful entrepreneurs apply? Do entrepreneurs with academic background shape decisions differently from those without one? The research conducted by Ruben Keferstein investigates these questions by applying mixed research methods and consequently, adding research to effectuation as a decision-making logic. The results show that entrepreneurs with or without academic background dominantly use effectual decision-making logics as opposed to causalational. Nonetheless, having an academic background does not have an inevitable influence on the preferred decision-making logic. After all, most of the academic entrepreneurs re-used their academic studies in their business in some way and would retrospectively study again.

Nonconscious perception of smart products – an empirical study

A daily routine with innovative, intelligent and networked products – Smart Products – would already be possible today. However, although technological progress is vast and offers enormous opportunities, these products are still largely unaccepted by consumers. To get to the bottom of this phenomenon, in her Bachelor thesis Marie Schüller carries out explorative research using the Projective Mapping and Free Association Methods. In doing so, she examines consumers’ subconscious aspects of the perception of Smart Products. Within this work, participants often perceived smart products as unnecessary and even scary and intrusive. Since participants particularly rejected upcoming smart products, this work underlines that our society is still far from being connected and smart. Accordingly, it is especially the practitioner’s job to use these findings as starting points for managerial actions in order leverage adoption.

The ‘Reversed IKEA-effect’ – can repeated customer co-production be too much of a good thing?

In recent years it has become increasingly popular for companies to involve customers in the creation of their offerings. According to literature, being involved in self-production leads to the ascription of a higher value to the self-made object by the involved consumer. This phenomenon, which has been defined as the ‘IKEA effect’, has been subject to numerous research papers in the literature on consumers’ behavior and their participation in the production of goods. Up until now, research has been focused on exploring the ‘IKEA effect’ under the constraint that the consumer participates in the creation of only one product. However, in reality consumers are often faced with repetitive tasks, e.g. building a line of furniture when moving. What feelings will arise under these circumstances? To get to the bottom of this question, Petya Dundeva and Nicholas Summers conducted a quantitative study in a laboratory setting.
Welcome drinks, free beer and good music: staff and students of the Research Area TIME do not need to be invited twice when it is time for another edition of the famous annual event. Also, the location, free entry and of course the nice company are good reasons for the TIME party to be so popular.

When the staff of the Chairs catches up around 10pm, in the beginning everyone bustles around the bar tables. Who would like to open the dancefloor in front of colleagues and the professors? However, after the first jars of the generously supplied free beer, some female research associates and student assistants dare making the first moves on the dancefloor. Within a few minutes, the male members of the Research Area TIME join them. In the later hours, Master students majoring in ‘Innovation, Entrepreneurship & Marketing’ provide active support. Meanwhile, the professors take care of maintaining the good atmosphere until the middle of the night by pouring out additional free beer.

At the last TIME parties, students and staff kept dancing until dawn. Afterwards, Master students often gave statements such as “I definitely chose the right major – it’s the only Research Area with an own party!”

We are looking forward to announcing the next event, because: It’s TIME to party!
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