Welcome!

This year, we mark a very special anniversary at the School of Management at the Technical University of Munich: It is 20 years since the School was founded. For all of us who work or study here, that is a cause for celebration – and a good moment to reflect on what we have achieved and what we stand for.

Since our beginnings 20 years ago, our goal has been to bring together two worlds long approached as separate disciplines: management and technology. Our mission is to bridge this gap through our research and our teaching, areas that we believe go very much hand-in-hand. Our researchers bring cutting-edge insights into entrepreneurship and thought leadership in many areas of management at the point where it intersects with engineering and the natural and life sciences. At the same time, we seek to educate a new generation of talented individuals who will be the innovators, leaders and decision-makers of tomorrow.

Our success speaks for itself. Since our foundation, we have fostered ongoing exchange between academia, society and the business world. We host top academics from around the globe, we welcome the most promising, entrepreneurially-minded students from Germany and abroad, and we regularly engage in exchange with leaders and industry representatives. These efforts are reflected in our rankings: We are proud to be recognized internationally as one of the top business schools in Germany.

In line with our belief in innovation and being open to new perspectives, we decided to give this brochure a somewhat unusual design. Look carefully and you will see that it is split into two halves. In one half we present six real-life stories about research projects at the School and businesses that were born here. The stories are arranged around the three key topics that we believe are driving change in today’s world: entrepreneurship, sustainability and digitalization. These topics are fundamental to our work preparing tomorrow’s leaders to tackle the grand societal challenges. In the other half of the brochure we present many useful facts and figures about the School, who we are and what we have to offer. To find out more, flip the brochure over and start reading from the other end!

Join me on this journey through the many different aspects of TUM School of Management. I hope that you, like me, will be inspired and excited by what you see.

Prof. Dr. Gunther Friedl
Dean of TUM School of Management
WE ARE DOERS WITH ENTREPRENEURIAL SPIRIT

THE PSYCHOLOGY OF STARTING A BUSINESS

For the last decade, the Entrepreneurship Research Institute at TUM School of Management has been researching how to successfully found start-ups. In their latest project, the researchers looked at how to encourage academics to create spinoffs based on their research, and the challenges facing individuals, teams and organizations.

Over a period of three years, the researchers observed prospective academic start-ups, founders, and teams that were in the process of creating a start-up. Their goal was to find out what could transform a detail-oriented scientist into a pragmatic entrepreneur.

The study, funded by the Joachim Herz Foundation, was led by Prof. Dr. Nicola Breugst, Professor of Entrepreneurial Behavior, and Prof. Dr. Dr. Holger Patzelt, Professor of Entrepreneurship. The researchers looked at how academics work with each other, and also with team members outside the research world. In particular, they examined why some teams are successful despite the high levels of uncertainty associated with starting a new business, while others fail. They also investigated how individuals cope with inevitable stress and setbacks. In addition, the research team looked into how organizations could best support the transformation of academics into entrepreneurs, for example, by instilling the right mentality, promoting interdisciplinary approaches and encouraging ongoing exchange between science and industry.

The team’s ten recommendations for promoting entrepreneurship

1. Embed entrepreneurship at universities by offering entrepreneurship education and space for start-ups.
2. Bring role models to the stage to demonstrate that starting a business is feasible for scientists.
3. Create space for scientists to develop entrepreneurial ideas and put their research into practice.
4. Push interdisciplinary approaches between faculties as an important driver for innovation.
5. Link business and academia at an early stage to identify opportunities for turning research findings into marketable products and services.
6. Use playful formats to inspire entrepreneurship, encouraging prototyping and experimentation.
7. Develop interdisciplinary founding teams by creating venues on campus where researchers from different disciplines meet.
8. Promote professional collaboration by offering individual and team coaching to tackle challenges early on.
9. Train start-up consultants on psychological topics so they can offer individualized coaching to founders.
10. Detect conflicts within founding teams early on with the support of start-up consulting services, and provide support in overcoming them.

– Prof. Dr. Dr. Holger Patzelt – Prof. Dr. Nicola Breugst

© Chris Kudler
THE IMPORTANCE OF NETWORKING

ParkHere is a multi-award-winning, leading high-tech provider of intelligent parking and mobility solutions for renowned companies all over Europe. The company develops IoT hardware and software products to optimally utilize and digitalize parking spaces.

The start-up was founded by TUM School of Management alumnus Felix Harteneck, who graduated with a Bachelor's degree in Management and Technology, and his two co-founders Clemens Techmer and Jakob Sturm, who studied Electrical and Computer Engineering at TUM. They first met through the Manage&More program at UnternehmerTUM.

During a brainstorming session, the young students found that there was no convenient solution to the problem of finding a parking space – even though studies show that a significant amount of inner-city traffic is due to this very issue, causing high levels of pollution, noise, and wasted time. That was the moment the idea for ParkHere was born.

At TUM School of Management, Felix says, he acquired the essential skills for building a business. In seminars on accounting and creating a business plan, he gained the knowledge he needed to run ParkHere. With the business plan they had drawn up during their studies, the founding team applied for several scholarships, such as EXIST, and further refined their idea.

With the help of UnternehmerTUM, the founders quickly became known for their sensor technology, which operates without a connected energy supply. “We would not have been able to do that so easily and so quickly on our own,” says Felix. ParkHere gradually evolved from a start-up to a scale-up. Today, ParkHere has grown from a provider of sensors to a market leader in complete parking management solutions.

The founders’ drive for innovation is relentless. We talked to Felix Harteneck about the role his studies played in founding a start-up and how ParkHere plans to help shape the future of mobility.

“WE WANT TO TRANSFORM CAR PARKING SPACES INTO MOBILITY HUBS.”

© ParkHere

3 questions for Felix Harteneck, Founder and CEO of ParkHere

Did TUM programs such as Manage&More and Think. Make.Start. help you found your business?

Definitely! I think the most important thing that TUM and UnternehmerTUM gave us was a network and access to companies. From meeting my co-founders and recruiting our first employees to acquiring pilot customers like BMW, a lot of what we have today started with TUM.

What tips about studying and starting a business would you give aspiring young entrepreneurs?

Being a student is the right time to start a business. But although being an entrepreneur is exciting, you should not lose sight of your studies. The most important thing I can pass on is this: Start building a network early. Having a broad network of entrepreneurs is exactly what TUM School of Management is known for. This will benefit you no matter what you do later. That includes looking for investors, which often takes a long time. If you start doing this while you are still studying, you don’t put your liquidity at risk.

What is your vision of the future of mobility?

We want to transform car parking spaces into mobility hubs. Sustainable mobility is an important aspect here. In the future, there will be more services in your car parking area and less individual traffic. Imagine, for example, that while your e-car is parked and charging, you can switch directly to an e-bike or scooter.
MAKING INNOVATION SUSTAINABLE

The EU Horizon 2020 project SCALINGS is a EUR 4 million flagship initiative that brings together social scientists, engineers, policymakers and industry partners from ten European countries. It investigates the use of three “co-creation” instruments – tools for cooperation between different stakeholders in innovation – focusing on two technology domains: robotics and urban energy systems.

SCALINGS is coordinated by Prof. Dr. Sebastian Pfotenhauer, Associate Professor for Innovation Research at TUM School of Management and TUM School of Social Sciences and Technology. He believes that innovation can be instrumental in contributing to sustainable development if mobilized in the right way. His research program strives to achieve a more nuanced understanding of what kind of innovation is socially desirable and how we can shape innovation in ways that reflect the specific social, cultural and political commitments of diverse groups and societies.

Sustainable innovation, according to Pfotenhauer, has to do with being able to live with the consequences of innovation in the long term. That means not just thinking about sustainable products and services but also innovation processes in terms of inclusiveness, legitimacy, social robustness and unintended consequences. This is where “co-creation” comes in, the idea of making scientific research more participatory by involving citizens, regulators and industry alongside specialists in R&D and sustainable innovation processes.

To drive sustainable innovation, there is a need for fundamental change in the way universities – especially technical universities – conceive of their role as mediators between technology and society. This affects every part of their mission, from the way they educate the next generation of engineers and leaders to the way they steer and reflect on their own research. It also impacts their role as spaces for public debate and dialogue about innovation and the future of society.

TUM School of Management has embraced responsible technology leadership as one of its core values and put in place additional incentive structures to emphasize the United Nations Sustainable Development Goals in its teaching and research. The School is committed to assessing how research relates to sustainability and developing a specific strategy to enhance the focus on sustainability in its key research areas.

– Prof. Dr. Sebastian Pfotenhauer
socialbee is the leading expert in sustainable integration in the German labor market. The company brings refugees and businesses together, helping individuals, who have lost everything, to build a career and a new life for themselves, while at the same time enabling companies to meet their personnel requirements with a more diverse workforce. The organization’s long-term integration rate is 86 percent. It is currently working with more than 40 companies on ongoing projects and over the last five years has built up a network of over 500 company contacts.

Since its founding in 2016, socialbee has created over 10,000 opportunities in the German job market. It is one of the most successful social scale-ups in Europe, winning widespread accolades. During the pandemic, it switched to a digitalized process with operations across Germany, Austria and Switzerland, and now plans to expand all over Europe.

Founder and CEO Zarah Bruhn started socialbee while doing her Masters in Management and Technology at TUM School of Management. “The University paved the way for me to start a business during my studies and to finish my studies even though I was an entrepreneur” she says. Most of all, she values the TUM ecosystem and its founding spirit: “The most important thing when starting a business is having role models and a supportive ecosystem. This is what TUM is all about, and it is why TUM is known as a founders’ university.”

socialbee exemplifies TUM School of Management’s commitment to social businesses as the enterprises of the future. Societies are becoming more diverse, but they are failing to offer equal opportunities to everyone. In line with the School’s core values, socialbee is working towards the UN Sustainable Development Goals, fighting to reduce inequalities and furthering quality education, decent work and economic growth.

“WE NEED MORE ROLE MODELS, MORE WOMEN WHO DARE.” – Zarah Bruhn

3 questions for Zarah Bruhn, Founder and CEO of socialbee

What would you say to students considering founding a social start-up?

“I want to encourage everyone to start a social business. We get so much support from all sides because we have a social mission and a good purpose. Suddenly, anything is possible.”

How can I become a social business leader?

“Follow your passion. With passion comes the idea, and the idea keeps you on track. Just do it!”

What is your message for women entrepreneurs in particular?

“We need more role models, more women who dare. The doors are currently open for female founders. The opportunities for individuals are better than ever.”
Digitalization is transforming vast areas of our lives. New technologies are fundamentally changing the way companies work. The Center for Digital Transformation (CDT), part of TUM Campus Heilbronn, develops solutions through practice-oriented research and thus generates direct benefits for business and society.

A study by Professor David Wuttke investigated the use of augmented reality in production. In his research, Professor Wuttke focuses on supply chain management, especially supply chain finance and behavioral operations management.

To investigate the question, the researchers carried out a field experiment at a manufacturing plant. This revealed that workers were immediately faster at their job when receiving instructions via AR smart glasses. Indeed, they performed their tasks in almost 44 percent less time than workers instructed using pen and paper. Not only that, workers who were assigned more difficult tasks benefitted the most from instructions via the AR glasses.

However, the study also found that the workers using the AR glasses did not appear to internalize their tasks. This revealed that when the AR glasses were then taken away from them, they became much slower at completing the same tasks than their colleagues instructed using pen and paper. In other words, they had not developed a sufficient understanding of the tasks and the AR glasses appeared to have become a crutch.

The investigation further revealed that workers who were instructed via the AR glasses showed significantly less potential to provide meaningful process improvement recommendations. This is an important finding, as the workforce in manufacturing companies can represent a valuable source of competitive advantage.

The authors conclude that manufacturing firms are left with a dilemma. Ramp-up speeds for tasks increase with the use of AR, but the same tasks may benefit the most from continuous improvement in the long run. Thus, while AR comes with immediate productivity benefits, companies that rely on the ingenuity of their workforce should be cautious about how they employ such devices.

The research findings are particularly significant, because unlike similar studies, it also reveals downsides of AR versus only benefits. It helps firms understand when – and when not – to implement AR. It thus provides a more nuanced perspective on the implementation of AR in manufacturing.
UNLOCKING THE BRAIN

The TUM start-up Brainamics could revolutionize the world of “playtesting” – the process in which developers of computer games watch testers playing the games in order to evaluate whether they are market ready.

Brainamics was founded by Philipp Zent, a TUM School of Management student, and Vladislav Samoilov, an alumnus of the TUM Physics Department, who first met at the TUM entrepreneurs program Think.Make.Start., a two-week course designed to foster innovation. The program, which TUM School of Management strongly encourages its students to participate in, gives students the chance to work on real-world problems.

Two core skills that Philipp gained during his Master in Management and Technology were to build a product that really solves a problem and to work efficiently in a team. This skill-set enabled Philipp to form an interdisciplinary team and develop Brainamics.

In the past, feedback from testers was limited to pen-and-paper surveys or talks with the games’ developers after the test, which is highly subjective. Brainamics is different. It draws on neurotechnology, using an electroencephalogram (EEG) to measure the brain activity of the testers in real time, while they are playing the game. It then applies machine-learning to analyze the data. By measuring which regions of the users’ brains are activated and how strongly, the system learns how focused the person is and if they are experiencing positive or negative emotions. Using this information, Brainamics can then figure out which types of emotions are present when testers play the computer game. For developers, the innovative technology opens up entirely new possibilities: For example, they can now identify the exact moment when a tester starts losing focus and gets bored.

Philipp and Vladislav quickly found common ground as passionate gamers and entrepreneurs, which led to the creation of the revolutionary start-up. For the development of their business idea the two received the Start Award for the business idea with the greatest potential in the 2021 Think.Make.Start. program. They were also prizewinners in the TUM IDEAward 2021 annual idea competition held at the end of November 2021.

“OUR TECHNOLOGY OPENS UP ENTIRELY NEW POSSIBILITIES.”

3 questions for Philipp Zent, CEO and Co-founder of Brainamics

Why is Brainamics so revolutionary?

“Many computer games flop on the market due to poor user experience. Developers need objective data that shows exactly what players feel and how engaged they are at any moment and place in the game. Our technology opens up entirely new possibilities for this.”

Are there other potential uses of this technology?

“Neurotechnology has enormous potential. For example, music streaming services can use it to test whether their playlists create certain moods. The technology is also of interest to marketing agencies.”

How has TUM School of Management supported you?

“TUM School of Management actively supports students who want to start companies. You actually get credits for a lot of the workshops and courses on entrepreneurship. So, you can complete your degree while working on your start-up – which is very cool.”
TUM SCHOOL OF MANAGEMENT
WHAT DEFINES US
TUM School of Management, firmly rooted within TUM’s technological and entrepreneurial ecosystem, places a unique focus on the interface between management, engineering and the natural and life sciences. The School’s goal is to bridge the traditional gap between the fields of management and technology.

The School sees its role as educating the leaders and decision-makers of tomorrow. Like TUM, it is committed to excellence. Since its foundation two decades ago, it has been consistently ranked as one of the top business schools in Germany and beyond.

1 BEST BUSINESS SCHOOL AT A TECHNICAL UNIVERSITY
Germany
QS World University Subject Ranking

6 TOP 6 MASTER IN MANAGEMENT
Germany
FT Masters in Management Ranking

2 TOP 2 MASTER IN MANAGEMENT
Germany
QS Business Masters Ranking

OUTSTANDING QUALITY
TUM School of Management belongs to the top one percent of business schools worldwide that hold Triple Crown accreditation by the Association of MBAs (AMBA), the European Foundation for Management Development (EQUIS) and the Association to Advance Collegiate Schools of Business (AACSB). Triple Crown accreditation is internationally recognized as a seal of quality for business schools.

A STRONG ENTREPRENEURIAL ENVIRONMENT
Helping our students develop an entrepreneurial mindset is a key part of our mission at TUM School of Management. The University’s record speaks for itself: Members of TUM have launched more than 1,000 start-ups over the last 20 years, supported by UnternehmerTUM – the University’s center for innovation and business creation. TUM School of Management fosters an entrepreneurial approach in its teaching and research, building on the expertise of the Entrepreneurship Research Institute (ERI). Many of our graduates start their own businesses in technology-based industries, leveraging their lasting connections to the School and its corporate partners.
MULTIPLE LOCATIONS, MORE POSSIBILITIES

TUM School of Management operates in five distinct locations, each of them carefully chosen for the possibilities that they offer to interact with other disciplines and the corporate world. Besides our original Munich and Weihenstephan campuses, we also offer research and teaching in Heilbronn, Straubing and Garching. At each of these sites we cooperate with regional actors, pooling our strengths to offer world-class conditions for study, research and entrepreneurship.

**MUNICH**

Munich and its surroundings area, one of the strongest economic regions in Europe, is where TUM School of Management was born. The local area is home to more DAX 30 companies than any other city in Germany, including such names as Allianz, BMW, Infineon, MunichRe and Siemens. Munich also has the most start-ups in Germany after Berlin.

**HEILBRONN**

Part of an initiative by the Dieter Schwarz Foundation, TUM School of Management has created a teaching and research facility at the state-of-the-art Heilbronn Education Campus.

At TUM Campus Heilbronn, excellence in research and teaching meets the exciting entrepreneurial challenges of one of the most innovative regions in Germany. TUM School of Management started operating at the Heilbronn campus in the winter semester of 2018/2019 and currently offers three study programs as well as cutting-edge research at its Center for Digital Transformation and the Global Center for Family Enterprise at the Campus.

Students and researchers investigate areas such as the management of digital transformation and family businesses, highly sought-after competencies in companies of all sizes.

**GARCHING**

Garching, just north of Munich, is home to the Entrepreneurship Research Institute (ERI) and UnternehmerTUM, two important players in the start-up scene. Together, they have helped create a large number of successful deep-tech start-ups, including “unicorns” such as Celonis, Lilium and Personio.

**STRAUBING AND WEIHENSTEPHAN**

The TUM Weihenstephan and Straubing campuses bring to life the connection between management studies and the natural and life sciences. Specializations include the sustainable use of resources. Both locations are also home to an emerging start-up scene.

“The at TUM Campus Heilbronn we have many opportunities for new, innovative approaches in teaching and research on topics relevant for the future. Professors, students and other members of TUM School of Management enjoy the international, dynamic and inspiring environment.”

Prof. Dr. Gudrun Kiesmüller
1st professor at TUM Campus Heilbronn and Director of the Center for Digital Transformation
MISSION
Grounded in our technological and entrepreneurial ecosystem, we educate responsible talents and pursue relevant research to advance innovation-based businesses and societies in Germany, Europe and the world.

VISION
Being one of the leading management schools at the interface with technology, engineering and sciences, contributing to solutions for grand societal transformations.

VALUES

- RESPONSIBILITY AND INTEGRITY
  We conduct research in line with the highest scientific and ethical standards and are committed to progress and innovation for improving people's lives. We teach general management skills with an emphasis on technology and in doing so, advocate the United Nations’ sustainability values of freedom, equality, solidarity, tolerance, respect for nature and shared responsibility.

- PASSION FOR EXCELLENCE
  We strive for excellence in our areas of research and publish our findings in order to create impact. We provide our students at all levels with a sound scientific education, not only to facilitate their starts in careers in business or in science, but also to improve their critical thinking so that they act responsibly in society.

- ENTREPRENEURIAL SPIRIT
  We research entrepreneurship and innovation and integrate the results into the education of our students at all levels in order to enable our students to think and act entrepreneurially. We encourage our TUM colleagues, students and doctoral candidates to found growth-oriented start-ups and facilitate their successful development.

- CURIOSITY AND OPENNESS
  We encourage research beyond disciplinary, institutional and national borders in order to open up new perspectives and generate novel research findings and ways to approach management practices. We develop talented individuals irrespective of gender, nationality, religion or belief, skin color, ability, age, or sexual orientation and are determined to learn from our students’ cultures, experiences and opinions.

- COLLEGIALITY AND “GEMÜTLICHKEIT”
  We foster a climate of mutual interaction, help and collaboration among students, faculty and administrative staff. Gemütlichkeit* is an attribute that we would particularly like to focus on.

*Gemütlichkeit (Ger.): “A feeling of warmth, friendliness, peace of mind and acceptance.”
STRATEGIC OBJECTIVES

1. RESEARCH AND FACULTY
   We are developing our faculty body to deliver excellent and impactful research results.

2. STUDENTS AND PROGRAMS
   We are developing our study programs to attract outstanding talented individuals and to educate them in management at its interface with engineering and science.

3. CORPORATE & START-UP CONNECTIONS
   We are expanding our relationships in the corporate world in order to increase the impact of our research and teaching.

4. INTERNATIONALIZATION
   We are embedding our school in an international network of advanced and strategic partnerships.

5. BRAND
   We are developing TUM School of Management as an impact brand.
“Our study programs provide management skills and in-depth competencies in modern technologies, natural and life sciences. TUM School of Management is a dynamic, inspirational and international community of students that attracts outstanding talent from around the world.”

Prof. Dr. Jürgen Ernstberger
Vice Dean of Academic & Student Affairs

“I had always wanted to pursue my interest in computer engineering and began to develop an interest in business and management, too. The Management and Technology program offered a unique combination of these fields and was therefore the perfect match for me.”

Angelin Panjaitan
Bachelor in Management and Technology
Two of our faculty members are ranked among Germany’s most influential economists by the Frankfurter Allgemeine Zeitung (FAZ): Professor Dr. Dr. Holger Patzelt, who has held the Chair of Entrepreneurship since 2010 and is Chair of the TUM Entrepreneurship Research Institute, and Professor Dr. Dr. Dr. h.c. Ann-Kristin Achleitner, who held the Chair of Entrepreneurial Finance and has been Distinguished Affiliated Professor at the TUM School of Management since 2020. Both individuals have made distinguished contributions to the media, research and politics.

In the coming years, we will continue to address key issues in digitalization, globalization and sustainable development in line with the United Nations Sustainable Development Goals. We will use our research expertise to help solve the grand societal challenges and grasp the opportunities offered by digitalization to further improve our research, teaching and learning.

RESEARCH

TUM School of Management is ranked one of the top business schools for research in the German-speaking world. Our success is to a large extent due to our interdisciplinary approach, our close cooperation with industry, our effective tenure-track career system for academics and our forward-looking orientation.

The School is particularly known for its interdisciplinary way of working. We pursue theoretical advances and ground-breaking applied research at the interface of management, engineering and the natural and life sciences, a unique approach that makes our research highly impactful. Our unusual perspective has also enabled us to attract around 350 German and international researchers to the School.

Our faculty publish around 200 peer-reviewed publications and receive more than EUR 8 million in third-party funding a year. Our research strength is widely recognized in leading independent rankings.

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“Excellent management research at the interface with technology and science is a core part of our mission. The School’s six cross-departmental research centers and cooperation with corporate partners enable us to perform impactful research with real relevance for society.”

Prof. Dr. Joachim Henkel
Vice Dean of Research & Innovation