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How Can the BISE Community Promote Tech Startups?

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Dennis Steininger · Rüdiger Zarnekow · Joris van Bohemen

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1 Introduction

Steffi Haag

Startups around the world raised around USD 329.5 billion in 2021 (Glasner 2022) including 10.5 billion Euros from startups in Berlin (Ernst & Young GmbH 2021) – more money than ever before. In the future, startups, especially tech startups that bring novel technology-empowered products or services to the market, are expected to significantly contribute to economic and technological growth and development, thus helping solve some of the world's greatest challenges.

Universities play a central role in the startup ecosystem. For the German Startup Monitor 2021 (Kollmann et al. 2021), the German Startups Association surveyed more than 2,000 startups and 5,000 founders, 85% of the startups were tech-related, and 85% of the founders spanned the

fields of business or science, technology, engineering, and mathematics. The 2021 survey demonstrated that every fourth startup had spun off from a university or research institution, that every second startup cooperates with research institutions, and that more than one-third of all respondents met their co-founders at university (Kollmann et al. 2021). Most startups appreciate this close relationship with universities and the opportunity to make use of several support services, such as consulting services (e.g., ideation, business plan, and financing), support with grant applications (e.g., EXIST Business Startup Grant¹), access to networks (e.g., mentors, founders, business angels, incubators), use of rooms (e.g., coworking space), or technical infrastructure services (e.g., computers, machines, laboratories). Figure 1 summarizes the most relevant support services of universities/research institutions.

Startups are as important for universities as universities are for startups. The reason for this is that startups bring scientific innovation to practice. Given the support universities currently offer, this discussion strives to explore what universities can do to promote startups and how the Business & Information Systems Engineering (BISE) community can contribute. The objective is to devise strategies that create and leverage synergies between the scientific community and startups in the BISE field.

The discussion builds on a panel held at the virtual *17th International Conference on Wirtschaftsinformatik (WI) 2022* that discussed how the BISE community – in addition to universities' efforts – could (better) promote tech startups tackling grand challenges. In particular, the following questions were raised:

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¹ <https://www.exist.de/EXIST/Navigation/EN/Start-upFunding/EXIST-Business-Start-up-Grant/exist-business-start-up-grant.html>.

Which support services offered by universities did German startups use in 2021?

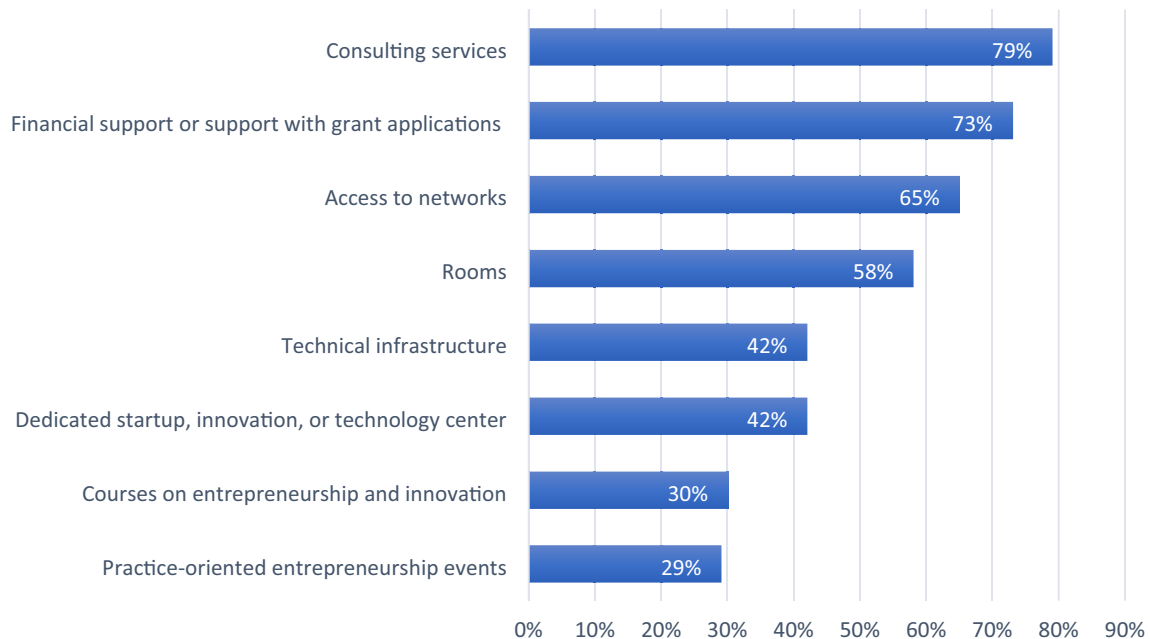


Fig. 1 The most relevant support services offered by universities/research institutions. Adapted from the German Startup Monitor 2021 (Kollmann et al. 2021)

- How do you, the BISE community, or your university currently promote startups? How do startups benefit from those activities?
- What could we do better? What can the BISE community specifically offer? What could startups do to improve the relationship?
- How can we leverage synergies between the BISE community, universities, startups, and investors to jointly solve large and complex societal issues?

This discussion brings together the perspectives of researchers, founders, entrepreneurs, and investors from different backgrounds and institutions. The five panelists – Christina Chase, Gesa Miczaika, Kathrin Möselein, Dennis Steininger, and Rüdiger Zarnekow – all have experience in either founding their own startup or promoting startups in the BISE field. Next, each panelist will provide their perspective on the questions raised above. In the end, the conclusion summarizes how the BISE community – in particular – can contribute to promoting tech startups.

2 Startups Driving the Dissemination of University Research: The Example of MIT

Christina Chase

Startups are important as they help disseminate research coming from labs into real-world applications. The Massachusetts Institute of Technology (MIT), and the broader Boston entrepreneurial ecosystem, does a lot to help students realize their innovative ideas and develop a startup business. To that end, MIT is constantly looking at how they might provide the resources needed to support the new needs startups require as they arise. The institution, and the Martin Trust Center in particular, constantly stay in touch with those who want to develop new ideas and start a business.

Supporting “tough tech” startups (e.g., related to science, pharma, robotics) is especially challenging due to the higher technical risk and longer timelines to bring them to market. Many great ideas fall into the so-called valley of death between research and commercial application (Barr

et al. 2009). For this reason, institutional support, and especially university support, is needed. The example of MIT shows how these initial obstacles can be overcome and turned into opportunities.

One driving factor is the space made available to students to experiment with their ideas, such as Project Manus and ProtoWorks, open makerspaces that give students the ability to prototype and test their ideas. In addition to open makerspaces, MIT has an internal funding process called Sandbox² where students can apply to receive anywhere from \$1,000 to \$25,000 depending on the stage of their project. This not only reduces the financial risks for the students, but also helps them with the technological risks and requirements. This academic environment to experiment, learn, fail, and pivot, before seeking outside investment, prepares students while also helping them to put their ideas into action and start developing the business around them.

Through this process, MIT noticed the challenge founders of “tough tech” startups were having in securing early funding so they put founding investment into a new type of venture capital (VC) fund called The Engine (A Home for Tough Tech Founders 2016). The fund focuses on “tough tech” to support the difficult step of launching those startups that have high technical risk and much longer time horizons to bring their products to market, providing access to capital, industry knowledge, and equipment for early-stage companies.

One of the core pillars of the MIT ecosystem is the Martin Trust Center for MIT Entrepreneurship.³ Students have access to experiential classes, facilities, such as fully outfitted meeting rooms, maker space, and entrepreneurs-in-residence, so they can learn, train their skills, and access to expertise throughout every stage, from concept to company.

These are all tools to help students learn, and potentially become, entrepreneurs and create startups. Through these resources, MIT hopes to bridge the gap from the first scientific work to getting this work out of the lab and into the real-work, ultimately putting this research into action.

3 Encouraging More Students to Become Entrepreneurs

Gesa Miczaika

Germany needs more innovation. One of the main levers is to encourage more students to become an entrepreneur. For the sake of argument, students can be divided into students that are intrinsically motivated to found an own

business and those who are intrinsically non-motivated to start a business. Intrinsically motivated students are eager to start a business and turn their startup into a larger company. However, a diverse group of founders is important for the success of a startup. Therefore, it is important to also include non-intrinsically motivated students to give them the opportunity to start their own businesses and support existing founders. In other words, incentives should be created for a variety of students to become more involved with entrepreneurship.

A crucial factor in making more students enter the startup world is early education with regards to entrepreneurship, which should be offered at scale in universities. To better involve all students in the entrepreneurial environment, it is important to show them more approachable and relatable role models, give them free time and a budget for ideas (e.g., better promote the EXIST fellowship), and connect them with angel investors and founders, especially from other disciplines (e.g., biotech meets business).

One example is the climate tech venture builder 1.5° Ventures from Berlin. It was created because the team behind 1.5° Ventures realized that not enough startups were being founded in the carbon offset space. So, they went to all the universities and tried to find smart people who were working on solutions. The venture builder tried to get them to become entrepreneurs, but most students are focused on their academic work and frequently want to stay in academia. They often do not see the opportunities in becoming entrepreneurs, but rather the risk encompassed in this endeavor. In the field of carbon offset, however, actually creating a startup is a great opportunity. Students can take the risk because plenty of alternative jobs are available for them if they fail. In Germany, we have an immanent skill shortage. Students should therefore be introduced to the idea of founding a startup as early as possible. Instead of only seeing the traditional career paths of joining an established company or staying in the academic context, students should be motivated to become entrepreneurs. This is also an opportunity for educators and other stakeholders who can get involved and see what ideas students are working on. In this way, educators can discover the next big thing in the industry and expand their horizons.

Another great example from Germany of how to incentivize students to create startups is the Center of Digital Technology and Management (CDTM).⁴ The CDTM takes MIT as a role model and has already built an extensive network to implement entrepreneurship within the academic institution and universities. The CDTM brings together interdisciplinary students with creative ideas, great motivation, and an entrepreneurial mindset.

² <https://sandbox.mit.edu/>.

³ <https://entrepreneurship.mit.edu/online-makerspace/>.

⁴ <https://www.cdtm.de/>.

The program is located at the intersection of digital technology, management, and entrepreneurship, providing students with the tools to put their ideas into practice (Center for Digital Technology and Management 2015). Students who participate in the program are rewarded with an honorary degree to further promote the program. Students work intensively with industry partners within the program to focus on the hands-on experience. In addition, the center's students and assistants themselves run the center, underscoring its entrepreneurial spirit. Major companies such as Celonis, Personio, Liliun, and others are a product of the CDTM, highlighting the program's success. The CDTM thus shows how German universities can adapt and apply MIT's practices to help students develop their ideas and start their businesses.

Once a network such as the CDTM is formed, it will also be attractive for venture capitalists (VCs) to participate. Large events can be planned where investors and students with their startup ideas can meet, share interests, network, and collaborate. This idea is consistent with practices already being implemented at MIT and other universities. However, there is a need for a general rollout of such tools and networks across German universities.

4 Fostering Entrepreneurship by Crossing Boundaries and Bridging Innovation Ecosystems

Kathrin Möslin

A general question is how BISE can contribute to more entrepreneurship among students. In addition to general education in the discipline, a contribution would be to focus on grand challenges and push the boundaries of traditional fields. Grand challenges can be defined as those that cannot be addressed by a single discipline, but are interdisciplinary and require teams contributing diverse skills. Why do I think the BISE field with its roots in computer science and business management is uniquely suited to address grand challenges? The reason is simple: the BISE discipline does not only draw its strength from its own interdisciplinarity encompassing these two root disciplines, but it also has a boundary spanning function to many other fields and disciplines needed to address grand challenges. By their very nature, BISE scholars do much to encourage students to become entrepreneurs, intrapreneurs, and changemakers by building bridges across boundaries. BISE students, scholars, and staff cross boundaries between business schools and schools of engineering or computer science. Bridging also goes far beyond the academic associations of our own and our sister disciplines. BISE is perhaps best placed to do this because it is itself a boundary spanning discipline.

By building strong bridges and crossing boundaries, universities can bring together entrepreneurial students and faculties from a variety of departments and disciplines. This requires individuals to cross boundaries and actively connect to people from different spheres – so-called *boundary spanners*. In addition, *boundary spaces* provide space to meet, build bridges, and create shared understanding. These places and spaces can help bring people together to facilitate conversation and collaboration.

Another approach to bridging disciplines in academia are *boundary concepts*, such as those implemented in boundary spanning programs. One example is FAU's Digital Tech Academy, which brings together students and young researchers from different levels and across all faculties. This really fosters entrepreneurship and venture creation.⁵ The interdisciplinary talent program provides an overarching hub for digitization and entrepreneurship at FAU and supports FAU's efforts to scale and professionalize digital entrepreneurship by integrating existing curricular offerings and novel formats, such as FAU's spin-off services.

Finally, to stimulate cross-disciplinary solutions, we need to formulate problems, tasks, or challenges that require multidisciplinary input. This brings us back to grand challenges. They are inherently boundary-spanning. Often, grand challenges are not attractive to academics who focus on challenges within their discipline and enjoy writing for the journals of their discipline. Recognizing work on grand challenges can help overcome this double hurdle and encourage cross-disciplinary communication and collaboration.

Within universities and academia as a whole, grand challenges can therefore help to motivate, mobilize, and implement cross-disciplinary efforts. Academics at all levels have good reasons to engage in these efforts, because it benefits not only the academic environment, but ultimately the individual who engages. It is in the nature of knowledge creation that new fields emerge. Statistics about how many tenure positions will be available for junior faculty in well-defined traditional disciplines have never been very reliable guides to careers: as people specialized in fields of the past, new fields emerged. This was no different in the early days of IS and BISE. The future growth of our field was underestimated by many. The same is true of many emerging fields and emerging disciplines, which often begin by bridging the known and exploring the unknown. Students, scholars, and staff are therefore well advised to start with an open mind and to challenge traditional disciplinary boxes and boundaries.

At FAU, we encourage boundary spanning in research, teaching, learning, entrepreneurship and innovation. In

⁵ <https://www.dta.fau.de/>.

research, the German Research Foundation (DFG) funding focuses on clusters and large collaborative research centers to foster boundary-crossing efforts. Not only are students and employers constantly challenging traditional curricula in education, but academics naturally develop their fields and educational offerings. In entrepreneurship and innovation, innovation labs, incubators, and accelerators provide boundary spaces for cross-border activities. At FAU, the Open Innovation Lab JOSEPHS® or the TechIncubator ZOLLHOF are examples of platforms that act as boundary spaces for innovators and entrepreneurial minds.⁶ Sabbaticals for academics and exchanges for students and staff are also strongly supported to foster innovation and experimentation outside the beaten path.

How does this fit into typical academic incentive and recognition systems? At FAU, we place equal emphasis on four strategic fields of action for academia. In addition to education and research, issues of leadership and innovation are addressed in the strategic fields of people and outreach. These four pillars (PEOPLE, EDUCATION, RESEARCH, OUTREACH) are reflected in recruiting processes, target agreements, faculty development, and, of course, in university management as a whole. Among other things, this ensures that FAU is and remains an innovation leader. It also helps to implement the so-called academic decathlon, which was introduced by Peter Mertens (Wiener et al. 2018). He compares the decathlon in sports with its different sub-disciplines to the different sub-disciplines in academia. To become a great role model and leader in academia, every scholar needs to be aware of, address, and ideally master each of the different sub-disciplines. Setting one's own priorities allows for profile building as well as individual success within and across institutions.

5 BISE: Integrating Technical and Business Competences for Startup Success and the German Economy

Dennis Steininger

A notable grand challenge is finding jobs for people and developing new jobs for people. This is a great motivation for the BISE community to help students become entrepreneurs and create startups. But what kind of startups are best suited to create jobs and is the BISE community suited for that?

A comparison of different types of startups shows that Information and Communication Technology (ICT) startups create most jobs, even compared to high-tech startups (Hathaway 2013). Another aspect: When comparing

European and American industries, many of the European companies are static. In contrast, American companies tend to shrink or grow rapidly (Bravo-Biosca et al. 2016). In other words, startups are a great opportunity for the European industry to create jobs, and ICT startups are probably best at it.

But what aspects are important for a startup to grow and succeed? Research shows that the combination of business and technology education in startup teams leads to the strong growth that startups usually desire. In a recent study that has not yet been published, preliminary results have shown that if the CTO or CIO of a startup has an educational background where he or she studied IT and business simultaneously, the success rates are significantly higher (Sassonko et al. 2021). Success was measured by analysing funding data on Crunchbase and social media.

On the other hand, as a community, the BISE discipline also addresses many critical elements for startups in research. For example, we look at the successful development of artifacts and how they can create business value and we try to understand how and why users adopt a particular technology. We also look at business models, markets, platforms, technologies and how we can enter or scale such markets with these technologies (Steininger 2019; Veit et al. 2014). All of these are critical dimensions of success for tech startups. The BISE community and education are therefore fundamental to developing successful startups and thus increasing job growth in a digital world.

The BISE community combines technical knowledge with business understanding and analyses how technology impacts the business side and vice versa. Not only does technology itself impact the business side, but many principles taught in technical courses, such as Agile Software Development, Scrum, and Design Thinking, can be perfectly transferred to the business side. Lean Startup, for example, can be seen as an agile software development applied to startup business model development. Many other principles from business administration can also be transferred to computer science. This allows students to experiment more, which in turn reduces the perceived uncertainty of pursuing a startup idea (Bocken & Snihur 2020). Reducing perceived uncertainty and risk is particularly important for the German market, where risk aversion is higher.

At the same time, it is a crucial point that we can make our students aware of entrepreneurship as a career path. Many students think that a corporate or consulting career is the perfect path, but this is not true for everyone and we know from literature that entrepreneurs show particularly high job satisfaction. Therefore, it is important to teach not only the use of technology in established companies but

⁶ <https://josephs-innovation.de>; www.zollhof.de.

also in startups, and how startups can benefit from technology.

In my opinion, startup courses should generally be integrated into university curricula and startup work during studies should be rewarded with credits and even beyond. My argument is that many students have not even thought about becoming entrepreneurs because they have not met interesting entrepreneurial role models and their passion has not been ignited. The introduction of credits for entrepreneurial courses will lead to more students considering becoming entrepreneurs. And even those students who do not start their own businesses can use many of the skills they learn to work as consultants or in a business. In addition, courses should provide more information about role models who began as startup founders and later became academics. This would show students that an interdisciplinary career path is possible and desirable.

Regarding the boundary spanning discussed earlier, there are still challenges in an interdisciplinary career path and it is not always easy to cross the boundaries as a university or professor. In my own career, I went from being an entrepreneur in practice, to an IS researcher in academia to a professor of entrepreneurship. The job description was looking for someone who could cover digital and entrepreneurship topics, which was a perfect fit for me. But crossing boundaries within one university can already be challenging. When students from different disciplines and faculties are granted access to a course, there is less room for students from the *own* discipline or faculty. This is a trade-off between spanning boundaries with its benefits for all participating students and fulfilling the needs and requirements of the students within the *own* faculty. However, it is really helpful for students from different disciplines to come together and find the right people for their startups. During my courses I have particularly found that combining business and technology students creates friction but also the most promising startup ideas with thriving teams. Implementing such formats promotes spill-overs, and we regularly see such teams continue after the course is over and credits are awarded. Integrating final student pitches with local investors further fosters such spill-overs and anchors startups in a region's entrepreneurial ecosystem.

In summary, the BISE community and academics in the field excel at educating students to become entrepreneurs. This, in turn, helps addressing the great challenge of creating jobs and growing the economy. While it is a perfect opportunity to see students from different disciplines come together and collaborate, the boundary spanning implications also represent challenges.

6 Supporting and Promoting Startups: Personal Commitment and Dedication by Members of the BISE Community

Rüdiger Zarnekow

One can approach the general question of how to assist students in becoming entrepreneurs from two different angles. On the one hand, from the general perspective of a university; on the other hand, from the individual perspective of researchers and educators. Both perspectives are relevant to the question and should be elaborated.

At the Technical University of Berlin, for example, there has been a strong focus on entrepreneurship and startups for many years. Students and researchers have been encouraged to pursue their own ideas and to become entrepreneurs. This is most likely true not only for the universities in Berlin, but for all universities mentioned in this discussion paper. Much progress has been made in general support for students over the last decades. The incubator at the Technical University of Berlin, for example, supports startup teams throughout the whole incubation process. It helps them develop their ideas and business models, access funding, and get ready for success in the market. There is also a large network of experts that teams can draw on to find help. In general, support at the university level has improved a lot. However, there could be an even stronger focus on entrepreneurship in teaching. The focus should be on deep tech, as there is great potential for innovations in this area.

On the other hand, there is still a long way to go on an individual level. Many professors still see themselves as pure researchers and their interest in startups and entrepreneurship is limited. This needs to change because supporting and promoting startups requires commitment and dedication on an individual level. From an individual perspective, prioritizing resources is the challenge here. Mentoring and supporting startup teams requires the investment of time and resources. To make this investment worthwhile, the goals of a researcher need to be better aligned with the goals of a startup. In detail: writing a research proposal might result in the reward of a research grant and funds from a third party that in turn fosters the researcher's career. When writing a research paper, the reward is the publication of the paper. However, when time and resources are invested in mentoring a startup, it is mostly just based on the personal motivation of the researcher. There are no specific rewards per se. In order to foster the support of startups, new incentives should be created. In this way, personal commitments can be increased and personal goals can be better aligned with the startup's goals. How to accomplish this is still an open question that needs further study.

It has already been mentioned in previous statements that there is a particular need to better promote deep tech innovations. For example, a Makerspace was opened at the Technical University of Berlin, similar to the makerspaces at MIT. A large area with lab space and tools was made available for the teams in the incubator. Providing this infrastructure helps students experiment and develop their business ideas. At TU Berlin, an Investor's Club has also been established, inviting potential investors interested in investing in Deep Tech. This group of business angels and early-seed VCs are invited to the university several times a year. Startups receive support in preparing to pitch and are given the opportunity to connect with these investors. Although these are welcome developments, educators and researchers should become more personally involved in the entrepreneurship process to support their students as early as possible.

7 Strategies Leveraging Synergies Between the BISE Community and Tech Startups

Steffi Haag

This paper brings together the perspectives of researchers, founders, entrepreneurs, and investors from different backgrounds and institutions in order to discuss how the BISE community is currently promoting tech startups and how we can improve our efforts. To summarize the different perspectives, this conclusion presents the following five strategies that have the potential to create and leverage synergies between the BISE community and tech startups. Each strategy builds on or extends the support services that startup-oriented German universities currently offer (see Fig. 1).

1. *Providing BISE expertise, mentorship, and networks:* universities can establish and promote dedicated startup centers, incubators, and accelerators to support startup creation and growth. BISE researchers can contribute by partnering with these programs to provide scientific expertise and mentorship, especially to startup founders tackling tech, deep tech, or “tough tech” challenges. By nature, BISE researchers serving as mentors are in a position to offer advice that integrates the technical and business aspects of starting a tech company. They can share their technical expertise in areas such as data science, machine learning, or process optimization, as well as their business expertise in the industry, market mechanisms and trends, or product development. By leveraging these interdisciplinary insights into cutting-edge BISE research, startups can develop innovative solutions, products, and strategies. In addition, BISE researchers can provide startups with access to their contact networks, including other researchers, industry experts, and potential investors. This can help startups build relationships with key players within and outside their disciplines and industries. Partnering with universities' startup, incubator, or accelerator programs provides BISE researchers with opportunities to apply their expertise and knowledge to real-world problems while also promoting innovation and entrepreneurship in the BISE field and beyond.
2. *Providing startup education based on BISE research and role models:* universities can provide training and education programs for startup founders, such as courses or workshops on innovation and entrepreneurship, to help them gain the skills and knowledge necessary for building successful businesses. BISE researchers can contribute as teachers by developing and delivering courses that incorporate the latest BISE research to help startup founders create value from innovative technology-empowered ideas. Additionally, by involving successful role models from the BISE community, these courses could inspire and motivate students to start their own businesses and bring their best ideas to fruition.
3. *Incentivized partnerships and collaborations with startups:* universities should incentivize and facilitate partnerships and collaborations between startups and BISE researchers to leverage the scientific expertise of both parties. BISE researchers can contribute by collaborating with startups on joint research projects and product development efforts. Startups could thus use cutting-edge BISE research to create digital innovations. Furthermore, as partners, BISE researchers are in a position to provide specialized knowledge and expertise, such as user experience and digital business design, to help startups develop and improve their products. Overall, by working together, BISE researchers and startups could leverage their collective resources to address theoretical and practical challenges. As a result, startups, the BISE community, and universities could benefit from new discoveries and insights.
4. *Supporting and promoting funding:* universities can provide funding opportunities, such as grants and seed funding, to support the development and growth of startups. BISE researchers can contribute by communicating these funding opportunities to (potential) startup founders, collaborating with startups on (joint) grant proposals, and providing scientific expertise to help secure funding. For instance, BISE researchers could advise startups on the types of grants and funding opportunities available in the field. They are further equipped to assist in the development of

competitive grant proposals by, for example, helping to review and refine methods and tools related to customer and product development, or by identifying potential challenges that could arise during the project. In addition, BISE researchers could provide guidance on the proposed project's feasibility and its potential ethical implications and/or help identify potential collaborators or partners to strengthen the proposal. BISE researchers themselves could continue to support the startup with their scientific expertise after funding is granted and assist with disseminating the project's findings. Overall, BISE researchers have the potential to play a critical role in helping startups secure funding and succeed throughout the project's life cycle.

5. *Supporting access to equipment and resources:* universities could offer startups access to equipment and resources, such as computers/computer clusters, laboratories, or data sets, and run makerspaces to support startup research and development efforts. BISE researchers can contribute by providing access to resources, such as hardware, software, or unique data sources, and by sharing their expertise in using these effectively. This might particularly help deep tech or “tough tech” startups develop and test their products more quickly and efficiently.

To conclude, these strategies have the potential to create and leverage synergies between the scientific community and startups in the BISE field, ultimately leading to innovative scientific advancements and more successful startups tackling the world's greatest challenges. The key is to build strong partnerships between BISE researchers and startups based on mutual trust and a shared commitment to sustainable economic and technological development.

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