

# Interview

with Prof. Dr. Hannes Utikal\*

Combining perspectives: How we are creating impact.

## 20 years of the Journal of Business Chemistry: The academic journal for management issues in the chemical and pharmaceutical industries

**When you reflect about your many years of experience publishing the Journal of Business Chemistry, what key insights or lessons have you gained about the intersection of the chemical industry and economics?**

The chemical industry is a fascinating industry characterized by some specifics at the intersection of natural science and management theory:

The chemical and pharmaceutical industries are energy- and capital-intensive **process industries** - still largely based on **fossil fuels and feedstock**. These industries encompass thousands of products used in different applications and enabling innovations on the side of their customers ("industry of industries"). The industry consists out of different segments, each having specific success factors, and typically showing a multiregional character. The industry has a long tradition, with the initial years of industrial chemical industries being dated back to the 1860s in Great Britain. Applying insights from industry lifecycle theory, the industry seemed to be until the 2010s in its maturity phase where the basic technological know-how is well diffused, and the focus is – except for patent-oriented pharmaceuticals and some innovative specialty chemicals – more on the side of technological improvements than on the side of breakthrough innovations. But with the need to defossilize its energy and feedstock base, the industry is currently confronted with the **need to reinvent itself**, its energy base, its feedstock, its value proposition to customers and society and the main technologies.

In addition, advances in biotechnology offer new opportunities for individualized pharmaceutical treatments and production processes, too. And advances in digitalization allow for product and process innovation. **Societal expectations** towards the reductions of the negative social and environmental impact of the chemical and pharmaceutical industries have been increasing over the years. **Geopolitical tensions** and international differences in environmental and social regulations influence the global footprint of the chemical and pharmaceutical industries, too. This is especially true for the 2020s.

These industry characteristics are an eldorado for researchers from the fields of chemistry, engineering and management theory: What **dynamic capabilities** do companies in the chemical industry need to master the described challenges? How will the **transition to a climate-neutral industry** be financed? What is the most promising public financial support mechanism to avoid carbon leakage and foster green innovation? What are successful **sustainable business models**, allowing for positive economic, ecological and social impact? What are relevant regulatory developments for supporting green and sustainable finance? How will the **global footprint of value activities** change due to regulation and geopolitical developments? And how will managers handle the ambiguities in the transformation phase with tensions between different economic goals and time horizons?

All these aspects can only be meaningfully approached with a profound understanding of the industry specifics and with the will to integrate research methods and findings from natural and social sciences.

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## Is there anything that has changed in recent years and are there examples where the journal influenced the industry practices?

The Journal of Business Chemistry has been a platform for the reflection upon current developments in the different segments of the chemical and pharmaceutical industries. Important topics for the chemical industry in the period 2000-2024 were

- **Decarbonization and sustainability:** The chemical industry is in the focus of climate policy and must significantly reduce its greenhouse gas emissions. The advances of the industry are largely interconnected with the activities of other stakeholders providing access to green energy and feedstock, regulate carbon capture and storage (CCS) and deciding about the regulatory and financial framework. Success of the Industry thus requires successful stakeholder management with a variety of private and public stakeholders.
- **Rising production costs and falling demand:** The chemical industry in Europe is struggling with high energy prices, inflation and falling demand. This is having a negative impact on competitiveness, particularly in energy-intensive sectors such as basic chemicals. The question of the future allocation of value chain activities is of utmost importance to European jobs and wealth.
- **Digitalization and technological change:** New technologies such as AI and data analysis offer the chemical industry opportunities to increase efficiency and innovate. The industry must adapt to the digital transformation, identify new business models and optimize its production and innovation processes.
- **Global shifts:** Asia, especially China, continues to gain importance as a production location for chemicals. European and American manufacturers must increase their competitiveness. This holds true as well for industrial parks – a trend towards the globalization of industrial park management competencies can be observed in recent years.
- **Skills shortage:** Demographic change and an ageing workforce pose challenges for the chemical industry in Europe in terms of recruiting and retaining staff. The workforce will become more diverse with regards to its skills and backgrounds, increasing leadership challenges.

These topics have been addressed in the Journal of Business Chemistry, too.

In 2023, we had a **special issue** on the topics of the **transformation of the European process industries towards climate-neutrality**, covering a broad range of important topics from different fields of natural and social sciences. In 2020 we published another special issue focusing on recent developments in the **innovation and production management in the process industries**. These special issues highlighted in a condensed manner the relevant questions of that time. They were developed in conjunction with academic workshops initiated by Professor Dr. Dr. Thomas Lager, Malardaren University, Sweden.

I appreciate the different types of articles we publish in the Journal of Business Chemistry: The **research articles** highlight innovation and original findings from research. The **practitioners' section** gives the floor to practitioners' sharing their experiences in form of a case study. This is especially valuable as a lot of the above-mentioned challenges are observed firsthand in management practice: Framing these challenges and reflecting upon those is an important value add of our journal: As James March has put it: "No new organizational forms have been invented by academics, they are invented by practitioners having to deal with specific challenges". The same holds true for the management challenges in the chemical and pharmaceutical industries. Being **close to the real-life challenges** allows to identify them and make them ready for academic investigation. Bridging the **gap between academia and practice** is one of the strengths of the journal. And the **commentary** is a forum for sharing substantial arguments on recent developments at the intersection of business and chemistry – these are a forum for sharing practical experiences and theoretical reflections in an early stage to foster the discourse on management challenges in the chemical and pharmaceutical industry.

**As the editor of a long-standing journal on Business Chemistry, how do you see the role of interdisciplinary research in advancing sustainable practices within the chemical industry, and what advice would you offer to young researchers interested in this field?**

I strongly believe that a practically relevant topic should be at the center of a research endeavor at the intersection of natural sciences and social sciences. Let's focus on the interface of industry specifics and management theory to create impactful research!

Once a "relevant" question is identified, the methodological questions need to be addressed (gathering and analyzing data etc). Of course, this implies the methodological rigor of the respective discipline, either in natural or in social sciences.

At the same time, it is crucial that the researcher has a profound understanding of the **multidimensionality of the practical problem**. For example: Changing from a combustion engine to a battery-based engine, does not solve all mobility challenges we face in cities (e.g. traffic jams). Often technical product innovations need to be accompanied by process and social innovations too (e.g. alternative ways of guiding traffic, changing mobility preferences). Thus, the researcher needs to see the field where she or he can make the scientific contributions – but needs to see the **embeddedness of the research activities in the broader societal developments**. Identifying and managing these linkages to the broader societal context, engaging in an inclusive language what can be understood by members of other societal groups too, is the prerequisite for **creating a societal impact**, if desired.

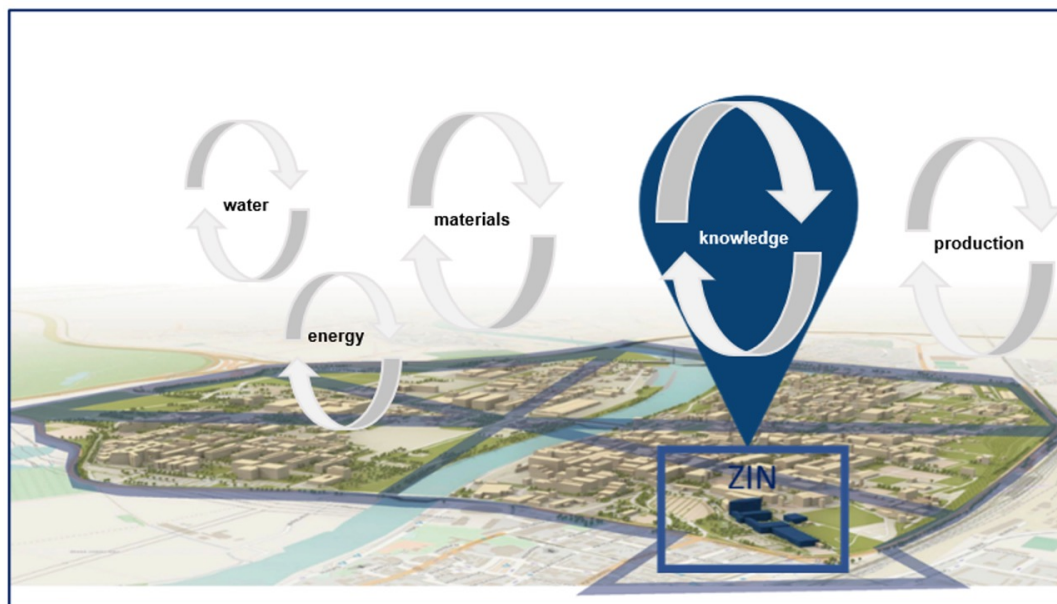
Being based at an industrial park, I see a broad range of highly practically relevant research questions and propose to capture some of them through **in-depth case study research**. I always like to bridge the gap between practice and academia. At the same time, I'm fully aware that some academic journals do not value case studies as they do prefer large scale quantitative research. Young researchers should be aware of their target – where do they want to create an impact and where do they see their future careers – and should choose the research setting accordingly. But I would be skeptical if a research question would only

be selected due to the availability of a large scale-dataset allowing for elaborated statistical analysis but lacking practical relevance. **Young researchers need both: Practical relevance and scientific rigor**. Just one of these aspects is not enough.

In addition, I'm convinced that management issues in the **chemical and pharmaceutical industries are "under-researched"** – given their high societal, economic and ecological impact. As "the industry of industries" providing the basics for the majority of physical products and with high direct and indirect effects on planet and people, I believe that the scientific community has still the potential for **creating a shared understanding of the most pressing issues** with relevance for the industry at the intersection of natural and social sciences. While the research questions in the field of chemistry as natural science are not context specific ("we need green and sustainable chemistry") I miss a shared research agenda for the management challenges in the chemical and pharmaceutical industries **highlighting the context of different continents and countries**. The natural, regulatory, political, social and economic environment influences management decisions in different countries. Analyzing this context and qualifying young researchers and students for acting context-specific, will advance the management of global chemical and pharmaceutical companies further. This will reduce the probability of developing isolated solutions (e.g. regulation on plastic in one region) at the expense of other regions (exporting plastic waste). **Systemic thinking and acting are needed for the "industry of industries"**, too.

**You are also the head of the Zentrum für Industrie und Nachhaltigkeit at the Provadis Hochschule can you tell us a bit about this center? What are key projects of you in this regard and where can interested individuals find out more?**

The Center for Industry and sustainability is located at the industrial park Höchst. For more than 150 years, industrial park Höchst has been a symbol of innovation and change. But how do you design a sustainable industry? We see ourselves as a **"think- and do tank" for a sustainable, future-proof industry**. We develop new knowledge, organize knowledge cycles and create a platform for knowledge exchange.



We are embedded in the Pro vadis School of International Management and Technology, an University of Applied Sciences and industrial park Höchst.

Figure 1 Location of the Pro vadis School of International Management and Technology in the industrial park Höchst (own representation).

In our innovative research and education projects, we develop practical solutions for the sustainable development of companies. We empower people to integrate sustainability into their business strategy and to transform their

organizations. However, to achieve profound change and address the major challenges of our time, such as climate change, a supportive ecosystem is required.

**Center for Industry and Sustainability**  
Let's create a sustainable industry together

**Transforming Industries**

We are supporting the industry to become more sustainable, reduce CO<sub>2</sub> emissions and benefit from digitalization. Through our projects we identify options for industry defossilization and new business development.

**Accelerating Sustainable Businesses**

We conceptualized the EIT Climate-KIC cleantech accelerator and managed it both regionally and internationally. We offer start-ups mentorship and support with sustainable business model development. For organizations we develop business creation and matchmaking formats.

**Educating Change Makers**

We create learning opportunities for national and international change makers. Our formats (e.g., workshops, trainings, summer schools) focus on real-life challenges and bring latest knowledge in effect. We make knowledge work!

**20+** high-impact projects on regional, national and global scale with partners from academia, industry and public authority.

**Key Facts since 2016**

Cooperations with **50+** companies

**350+** start-ups in 13 countries supported

**2.500+** participants in our education formats

Activities with a funding of **18 million euros**

**Selected Projects**

**CO<sub>2</sub>-Neutrality: Cluster Process4Sustainability**

**Process4Sustainability**

**Management of European Cleantech Accelerator**

**Sustainable Industrial Area (SIA) Management Courses with GIZ**

**Projects with impact in 30+ countries**

**Sustainable Industrial Area Management**

Status as of September 2023

Figure 2 Overview of projects and key facts of the Pro vadis School of International Management and Technology (own representation).

ISSN 1613-9623 © 2024 Prof. Dr. Jens Leker (affiliated with University of Münster) and Prof. Dr. Hannes Utikal (affiliated with Pro vadis School of International Management and Technology)

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With the vision of a CO<sub>2</sub>-neutral process industry in Hessen, we founded the Process4Sustainability cluster with companies at industrial park Höchst. We believe that a sustainable industry can only be achieved by working together, which is why our activities are based on close cooperation with national and international partners from science, business, and the public sector. Therefore, in addition to companies, research institutes and social innovation partners are also part of our cluster. Further information about our cluster can be found here [www.process4sustainability.eu](http://www.process4sustainability.eu).

### **In your opinion, what are some of the most pressing sustainability challenges currently facing the chemical industry, and how can academia and industry collaborate to address these challenges effectively?**

Companies in the chemical and pharmaceutical industries are particularly challenged when it comes to their sustainable development. Let's take the transformation towards climate-neutrality as an example. We may differentiate between two interrelated challenges, which only can be solved when a variety of actors from all parts of society collaborate.

On the one hand, the transformation process must be handled from a technological and economic perspective:

- From a technological perspective, incremental technological changes are not enough to achieve climate neutrality; new technologies are required. For example, water electrolysis using renewable electricity to produce hydrogen, carbon capture and storage or the electrification of high-temperature crackers are being developed and tested. It is still difficult to estimate when which technology will actually be available on a large industrial scale and at what price. Large quantities of renewable electricity are a prerequisite for many alternative technologies. It is still partly unclear where, under what conditions and at what price green electricity will be produced. The ecological transformation of the chemical industry therefore also requires a cross-sectoral approach, which must take into account new national and international infrastructures to be established.
- From an economic perspective, many technologies for a defossilized chemical industry will not be

competitive with conventional technologies due to their higher production costs without a global CO<sub>2</sub> price. The production costs are largely dependent on the development of the price of electricity and CO<sub>2</sub>. Studies estimate the investment costs to be acceptable for society as a whole, but a challenge for individual companies. Against the backdrop of uncertain future framework conditions, companies assess whether and how they should change their business model and which technologies they should invest in. They not only have to plan how to enter new technologies (entrepreneurial innovation), but also how to exit established technologies (entrepreneurial exnovation). All of these decisions are highly dependent on the chosen regulatory framework. The transformation is thus not only dependent on technological and economic developments but as well on societal ones.

The **transformation process can be understood as a multi-actor decision-making process** with a variety of goals as many players bring very different perspectives to the solution of this challenge. If the transformation of the chemical industry is understood as a **decision-making problem** in which the best solution must be selected from a range of alternatives against the background of a target function, then the conflicts can relate to various elements of the decision-making model:

- Who constructs the **decision problem**? (A national government? The company? NGOs? Who with what legitimacy?)
- Which **alternatives** are considered? (Which technologies and policy instruments are taken into account?)
- Which **objectives** are used for the assessment and how are they weighted? (How are the various economic, ecological and social objectives to be weighted? Is the goal of 1.5 or 2 degree compatibility the leitmotif?)
- Which **benefit function** is assumed? (What is the environmental effect of which technology? What costs and benefits are incurred by companies or society? What impact do the decisions have on competitiveness and jobs in Europe?)
- How should the **timing of the decisions** be organized? (At what point in time should which decisions be made? Does it make sense for a company to delay decarbonization measures, as better technologies may be available in the future?)

It is obvious that these questions are answered very differently by the various players (companies, politicians, society).

A close collaboration between academia and industry is needed to tackle these challenges: Academia may provide the knowledge to identify, structure and frame the described challenges and identify, develop and evaluate potential technical and societal solutions. But bringing all these ideas into life, financing and upscaling the solutions can only be done with the help of motivated entrepreneurs ready to reinvent the chemical industry, acting within the limits of the planetary boundaries and defossilizing its feedstocks and energy. That's why I believe that we will need the „Journal of Business Chemistry“ in the future, too. It is a relevant platform for collaboration: „Business meets chemistry“ and „Academia meets practice“. This is in a nutshell how we create impact for the sustainable development of the chemical and pharmaceutical industries.

Interview conducted by: Andrea Kanzler