



BIO SCIENCE VALUATION

Knowledge and Evidence-based Solutions

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Joachim M. Greuel, Ph.D., MBA

Statement of our Founder & Managing Director

In an era characterized by some as 'post-factual' or 'post-truth', we are strong defenders of a business culture in which decisions are driven by facts rather than beliefs. Good managerial decisions rely on comprehensive information and valid assessments, essential elements that make the creation of new treatment options predictable and successful. R&D and commercial risks do not need to be accepted outright: they can be identified and managed!

We optimize economic outcomes for the business of developing new medicines and related healthcare products. Our decision models are the product of our in-depth commercial, R&D, economic and financial expertise combined with our pioneering analytic capabilities. We generate validated, fact-based evidence that provides the basis for making rational decisions, persuasive arguments and convincing communications for today's pharmaceutical executives, enabling them to achieve their scientific and business goals. Our services are second to none, and lead to executable business strategies.

About Our Company

Bioscience Valuation BSV GmbH ('BSV') is a globally operating premier life sciences valuation company founded in the year 2000. We help our clients in the healthcare sector to understand and improve the value proposition of their investments as well as minimize underlying risk to enable well-informed and highly rational executive and managerial decisions. Based on our assessments we support our clients 'hands-on', e.g., to license a drug or to sell a business unit.

All our senior personnel have professional life-science degrees combined with a business education. Our experience is grounded in more than 500 evaluations in a broad spectrum of therapeutic areas. We serve clients from all industry branches:

BIOTECHNOLOGY
PHARMACEUTICALS
MEDICAL TECHNOLOGY
DIAGNOSTICS
INVESTMENT COMPANIES

Key Milestones

We are at the forefront of establishing evidence-based asset evaluation in the pharmaceutical industry. Working with senior managers and project teams, we convince our clients that taking advantage of all available information, integrating R&D and commercial assessments and applying financial modeling generates an in-depth understanding of R&D projects and supports informed go/no-go decisions.

We expand our services to companies outside of Europe. We open an office in the USA and are now also serving clients in Asia. Beyond individual asset valuation and portfolio management we offer additional services such as primary market research, disease area landscape mapping and strategic planning consultation. Lectures given at international conferences and publications showcase our capabilities and expertise.

A significant number of biotechnology companies have been founded in the past few years. With their emergence, we develop productive working relationships with start-ups and build business cases to support successful fund raising, partnering of assets and filing of IPOs. The pioneered evaluation methodology has become industry standard.

Our team continues to grow. We enhance our skill sets with more expertise in M&A, divestment and in-depth clinical development, positioning us to work with our clients optimally in advancing personalized treatment paradigms, including companion-diagnostics. We now include market access and pharmacoeconomic parameters in our economic models to fully appreciate the return-potential of science investments as well as related risks.

Through our Corporate Partnership Program, we are entering into more and more true partnerships with biotech and pharmaceutical companies. These programs offer our clients a 'preferred status' that provides BSV's full services at considerable economic benefit. For example, clients with needs related to technology, market and value assessments, can outsource them to us to take advantage of BSV's enormous expertise as well as unique capability to access relevant information.

2000

2005

2010

2015

2020





Why Choose Us

We will listen to you closely to thoroughly understand your business objectives. Through an intense dialogue across all hierarchical levels and disciplines, we will create solutions customized to your needs.

BSV is considered a thought leader in healthcare economic analytical techniques and assessments as demonstrated by numerous, peer-reviewed publications. Our economic studies on healthcare systems have been cited in the press (e.g., The Wall Street Journal, 20 March 2013).

BSV's valuation business principles unite scientific and business goals along the entire value chain of the drug development process from discovery research to marketed products. We are well-known for our deep understanding of science and markets including conceptual, analytical modeling methods. BSV's evidence-driven appraisals are based on our profound subject expertise and long-standing experience, and are backed by comprehensive research using our own proprietary database, secondary data sources and, where appropriate, primary market research.

Yet, we do not stop here. We engage in all required activities to produce tangible results.

Meet Our Team



Joachim M. Greuel, Ph.D., MBA,
Managing Director and Director
Commercial Assessments

Formerly: Investment Manager, New
Medical Technologies Venture Fund

'I assist clients who wish to base their
decisions on thoroughly researched
information, or need to establish
fact-driven managerial decision
making in their organizations.'



Sabine Bernotat-Danielowski,
Ph.D., MBA,
Director Business Development and R&D
Assessments

Formerly: General Manager, Daiichi
Sankyo Europe Drug Development

'I support our clients to create value
from evidence-based R&D which
aligns scientific ideas with final drug
product attributes to deliver patient-
centric, value based care.'



Doug Morgan, Ph.D.,
Director USA and R&D Assessments

Formerly: Senior Director Clinical
Development, Regeneron

'I optimize R&D processes with a
particular focus on translational
medicine and support the
management of company
partnerships.'



Dietmar Gundel, MSc,
Director Corporate Finance and
M&A

Formerly: Managing Director,
ACOFIMA AG, Corporate
Development and Corporate
Finance Advisory

'I ensure the successful execution
of transactions from partner
search to signed agreement.'



Pradip Bhatnagar, Ph.D.,
MBA, Director Asia-Pacific and R&D
Assessments

Formerly: President Daiichi Sankyo India
Pharma Pvt. Ltd.

'I overview and review
pharmacological targets and
innovative approaches to reduce
attrition rates in development.'



Prof. Alexander Schuhmacher,
Ph.D., MBA, Director R&D
Performance Metrics & Business
Model Innovation

Formerly: VP Strategic Planning
Altana Pharma

'I measure R&D performance
and streamline R&D processes
to maximize R&D productivity.'



Thomas Zürcher, Ph.D.
Director, Southern Europe

Formerly: CEO, Formune

'I will work with you to focus on the best
therapeutic indication and choose the most
optimal R&D strategy for your products.'



Engelbert Paschek, MS,
Head of Economic Modeling

'I model potential project
scenarios, preparing our clients
to respond to all possible future
outcomes.'



Corina Ricci, MA, PRC,
Manager, Marketing & Research

'I contribute primary and
secondary research to enhance
our analyses and forecasts, as
well as cultivate a good, strong
collaboration with key opinion
leaders and physicians of all
specialties.'

Our Services

Bioscience Valuation offers a suite of analytical and strategic products designed to operate in a modular fashion. Their integrated application enables complete assessments from a scientific and commercial perspective. Alternatively, certain modules can be selectively chosen to target specific needs as identified by our clients. Even when the assessment has been established, we can continue to support our clients in executing their next operational steps. Clients benefit from our services when they wish to address these business issues:

- optimize go / no-go and investment decisions
- maximize value in licensing deals, funding rounds (including IPO filing), and portfolio management
- minimize risk in research and development to increase R&D productivity
- assess future healthcare markets and sales opportunities
- analyze competitive landscapes
- predict cost-effectiveness
- communicate value to investors, licensing partners and other stakeholders
- partner successfully in licensing, M&A and asset divestment (including identification of, and negotiation with, potential partners)

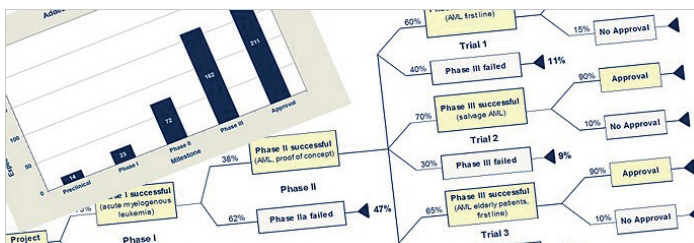


The Bioscience Valuation Approach: Our Core Assessments

Key elements of our analyses are the R&D assessment as well as the assessment of commercial potential and commercial risk.

R&D Assessment and Optimization

- Assessment of a drug's mechanism of action, degree of target validation, as well as available evidence from target-related clinical studies and real-world data (including predictive analytics) to optimize drug positioning and minimize risk of failure
- Indication prioritization based on sales potential and evidence from research, preclinical and clinical data
- Creation and/or analysis of development strategies, associated costs, risks and timelines
- Modelling of alternative development strategies to identify one having optimal value-maximizing and risk-minimizing properties
- Simulation of clinical trials with real-world data to provide more confidence
- Implementation of actions to minimize development risk



The assessment takes advantage of our comprehensive access to subscribed and public databases, including our own proprietary one compiled from our extensive experience. The results of our risk assessments are typically used to assess likelihood of launch, optimize clinical development and determine project value.

Assessment of Commercial Potential and Commercial Risk

- Description of disease/s and standard of care
- Analysis of medical need for the targeted disease(s), subgroup analyses
- Formulation of a target product profile (TPP)
- Derivation of a potential market price based on the TPP and reference prices; we include pricing of approved therapies (standard of care) and consider loss of patent protection (price erosion)
- High-level pharmacoeconomics (cost-effectiveness)
- Mapping of the treatable patient population, including potential biomarker-based stratification
- Detailed assessment of the competitive landscape, working out TPPs of competing drugs (also of those in development)
- Derivation of a potential patient/market share considering already approved and potential new therapies
- Sales projections (key 7 major markets, EU28, BRIC, RoW)

Our commercial assessments support indication prioritization and are a key input variable for valuations, also in the context of licensing and fund raising.

Product Value Assessment

To assess the value of a product, we primarily use an “expected net present value” approach (‘eNPV’). We can also compare the eNPV to the values of existing products targeting the same market. Development and commercial success probabilities and a product’s sales potential are determined by our core assessments described above. A net cashflow-based value is calculated by including operational costs, timelines and a discount rate.

Business Case Creation

We develop business cases for projects, pipelines, and companies in an objective and quantitative manner. Our documentation includes all input data, references and assumptions, the considered development options and the preferred investment case. We offer flexibility to either create the entire business case or assist our clients in their efforts to do it.

Support for Business Development and Licensing

We offer a modular approach so that clients can choose whether they wish Bioscience Valuation to handle the entire process end-to-end from business case creation, identification of potential partners, deal-term negotiation to deal closure or whether support of specific steps serves their needs.

Careful assessment of the value-impact of various upfront and milestone payments, royalties, and other deal elements such as options is an integral part of our work. We ensure that deal terms and partnership models provide a fair return for our clients. Our experts are always available to defend suggested deal terms in negotiations with potential partners.

Strategic Planning

Many of our clients want to review their R&D strategy. We offer consultation and analysis from our deep knowledge of the healthcare industry including new directions such as precision medicine, pharmacoeconomics, value-based pricing and mapping of competitors to asset evaluation and portfolio management. This enhances our clients’ understanding of the strengths and weaknesses of their pipelines, competitive environments and market dynamics - all of which enable the identification of unique opportunities.

Key Opinion Leader Meetings

We organize interactive sessions to solicit input from subject matter experts who are highly recognized in their respective fields, from our own network and/or as selected by our clients. Their range of views on, e.g., medical need, new treatment paradigms or patient compliance, will inform our assessments and guide future managerial decisions.

Primary Market Research

For structured and precise insights into potential markets, e.g., market dynamics and patients’ perspectives, exploratory or specific primary market research is carried out with various target groups such as healthcare providers, payers, and patients.

For all our services, we provide well-researched, evidence-based information that facilitates rational decision making to determine and execute value-maximizing business strategies.

How We Work

We work collaboratively with our clients and provide customized, comprehensive solutions to maximize their businesses' value propositions through a deep understanding of the science and markets and conceptual analytic modeling methods. We will not only plan for you, we will help you achieve your aims. Although the majority of our clients are within the pharmaceutical and biotechnology industries, our expertise is applicable to medical technology, diagnostics and healthcare systems as well.

The initiation phase of all assignments is interactive and includes a briefing, determination of client specifications and our first proposal. After further input the final proposal forms the basis for the contractual agreement. During the execution phase the deliverables will be discussed at agreed milestones, being mindful of the client's perspective. We ensure that all knowledge gets transferred to the client's organization.



In addition to individual projects, we offer repeat clients or new clients who plan to engage BSV repeatedly cost-efficient access to BSV's expertise and knowledge. These premium clients enjoy full support with a short turnaround time and immediate availability of our experts.

For each valuation, BSV can take advantage of the experience gained in more than 500 healthcare evaluations performed by the company during the past two decades. Our experts have performed valuations for projects covering virtually all indications, including orphan and ultra-orphan diseases.

About 60% of the projects assessed have been at the discovery or preclinical stage, about 40% have been in clinical development (Phases I - III) or are marketed products.

For its analyses BSV has a large internal dataset available. We also subscribe to all relevant commercial and public databases that altogether provide a wealth of information to determine benchmarks for project attrition rates (often indication-specific), development times, development costs, competing drugs (launched or in development), pricing and pharmacoeconomics, and deal terms.

Our Projects

Here are some examples of our contributions:

Medigene's (Germany) >\$1 billion agreement with Bluebird Bio, Inc. (USA) to develop T-cell receptor therapeutic candidates against four targets to be generated using Medigene's proprietary TCR technology platform

Proteros' (Germany) early stage \$126 million (plus royalties) collaboration with MSD (USA) for the discovery of small molecule compounds against an epigenetic target for the potential treatment of various types of cancer

Oryzon's (Spain) \$500 million deal with Roche (Switzerland) to develop LSD1 inhibitors for oncology, hematology and non-malignant conditions; BSV valued Oryzon's LSD1 program

The M&A transaction between Daiichi-Sankyo (Japan) and Ranbaxy (India); the transaction's value exceeded \$6 billion; BSV's role was to value Ranbaxy's 'New Drug Discovery Research' pipeline

Affirmed's (Germany/USA) IPO on NASDAQ; the IPO valuation was \$180 million

Merger between the public Sygnis AG (Germany) and the privately held Expedeon Holdings Limited (UK); company valuations according to the IDW S 8 guideline

Implementation of portfolio management at Merck KGaA (Germany)

Project and portfolio assessments at Bayer Schering Pharma AG (Germany) and Daiichi Medical Research (USA)

Implementation of a revenue and capacity forecasting system for Boehringer Ingelheim Biopharma (Germany)

Portfolio analyses at Organon Pharma (Netherlands)

Creation of a R&D spin-off for Grupo Uriach (Spain)

Acquisition of pharmaceutical projects by Walcom Bio-Chemicals Ltd. (China)

Large-scale type 1 diabetes field research reaching over 2,400 respondents in selected regions of three countries for The Leona M. and Harry B. Helmsley Charitable Trust (USA)

Study on the economics of defensive medicine and potential effects of a "No-Fault Patients' Compensation System" on healthcare spending (USA, cited in the Wall Street Journal)



Our Clients' Voice

Dr. Torsten Neufeind, CEO Proteros: 'I am impressed by Bioscience Valuation's very profound, analytical approach to evaluate early discovery projects. Bioscience Valuation substantially supported us in successful partnering negotiations, and it is a continuous pleasure to work with Joachim and his team.'

Peter Llewellyn-Davies, CFO/CBO Medigene AG: 'Through its 'Corporate Partnership Program', Bioscience Valuation has provided exceptional support in the transformation of our business model. BSV's evidence-based assessments proved invaluable for our strategic decision making as well as for preparing our corporate transactions.'

Dr. Philipp R. Hoffmann, Senior Director Business Development & Licensing Europe, Daiichi Sankyo: 'Bioscience Valuation's comprehensive assessments of in-licensing candidates provide us with a thorough understanding of the opportunity, both from a scientific and business perspective.'

Prof. Dr. Klaus Nickisch, CSO Evestra Inc., formerly Head of Project Management at Bayer Schering Pharma AG: 'Bioscience Valuation's unique approach to portfolio management clearly enhanced the value of our R&D pipeline.'

Dr. Axel Wiest, COO R&D, Merck-Serono: 'I like the insights gained from Bioscience Valuation's thorough assessments that allow me to support my decisions with well-founded, rational arguments.'

Dr. Folker Ruchatz, SVP Contract Manufacturing Business, Boehringer Ingelheim Biopharmaceuticals GmbH: 'I am impressed with Bioscience Valuation's professional approach that enables us to plan future revenues and capacity utilization much better now.'

Dr. Adi Hoess, CEO Affimed: 'Bioscience Valuation's services help me to communicate the value of our business to various stakeholders, including investors.'

Prof. Dr. Thomas Danne, Director, and Dr. Bärbel Aschemeier, Clinical Research, AUF DER BULT Hospital for Children and Adolescents: 'With the dedicated support, and particularly the experienced, constructive work of Bioscience Valuation, we accomplished meaningful results that provide important new knowledge enabling our next steps in diabetes research. We sincerely thank the entire Bioscience Valuation team for their valuable and straightforward collaboration in the past year, and look forward to the next opportunity of working with them again.'

Rick Jackson, Chairman and CEO, Jackson Healthcare: 'Both, breadth and depth of Bioscience Valuation's economic assessments as well as the company's excellent knowledge of healthcare markets are invaluable assets for me in order to reach my goals.'





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