Report

2022

Cloud & Digital Solution Adoption in Bio-Pharma Manufacturing

A4BEE DELIVERING MEANINGFUL INNOVATION

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01

Cloud & Digital Solutions Adoption in Bio-Pharma Manufacturing

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Cloud Adoption in Bio-Pharmaceutical Manufacturing

Organizations across industries are choosing to migrate to the cloud. **The business advantages** of adopting cloud technology are increasingly being highlighted, with a focus on **cost reduction, flexibility, and new digital and smart capabilities.**

The cloud enables better collaboration by eliminating data silos and allowing experts to work together across different geographies. Cloud service providers are a major gateway to access digital innovations such as AI, IIoT, No-Code/Low-Code platforms, and more. Companies can use crowdsourced ML algorithms to help explain and predict equipment failures. They can use advanced analytics to share interactive dashboards with other companies across the supply chain.

Pharma businesses don't introduce any technology without analyzing the risks and benefits related to it. These companies work with a lot of confidential data, intellectual property and trade secrets for drugs that are yet to be launched.

The pandemic has accelerated the pace of cloud adoption by the pharmaceutical sector. **More than 83% of pharmaceutical companies are already using cloud services**, says a survey report by the Healthcare Information and Management Systems Society.

The pharmaceutical industry has made progress in developing vaccines, and new drugs to reduce the spread of virus infections. Massive investments have been made in R&D over the last 2 years, and the cloud has become a key enabler to cut costs and efficiency improvement. As per the latest Research Reports World report, the Pharmaceutical Cloud Computing market revenue was **USD 3173 million in 2019** and will reach **USD 7021 million by 2025** at CAGR of 14.15% from 2020 to 2025.

Bio-pharma manufacturers are introducing new cloud-based features to support their operations. Given cloud impact on the sector and the countless benefits it offers, it is clear that any pharma company that intends to grow needs cloud computing.

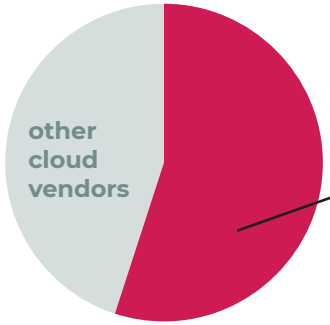
Assuming that you want to take advantage of cloud too, I recommend that you contact a reputable provider of digital solutions for the pharmaceutical industry, like A4BEE.

Karolina Marzantowicz

Chief Of Growth Business & Technology Solutions

Cloud computing is the fast-growing market, but still, it is provided by a few most prominent players.

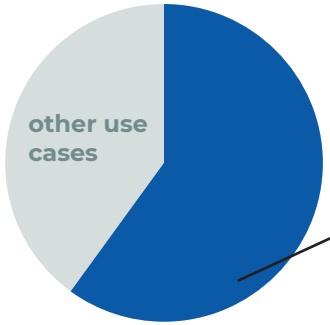
Cloud market consolidation



55%

share occupied by the major players AWS, Microsoft, Google, Alibaba, Oracle

Biopharma manufacturing use cases



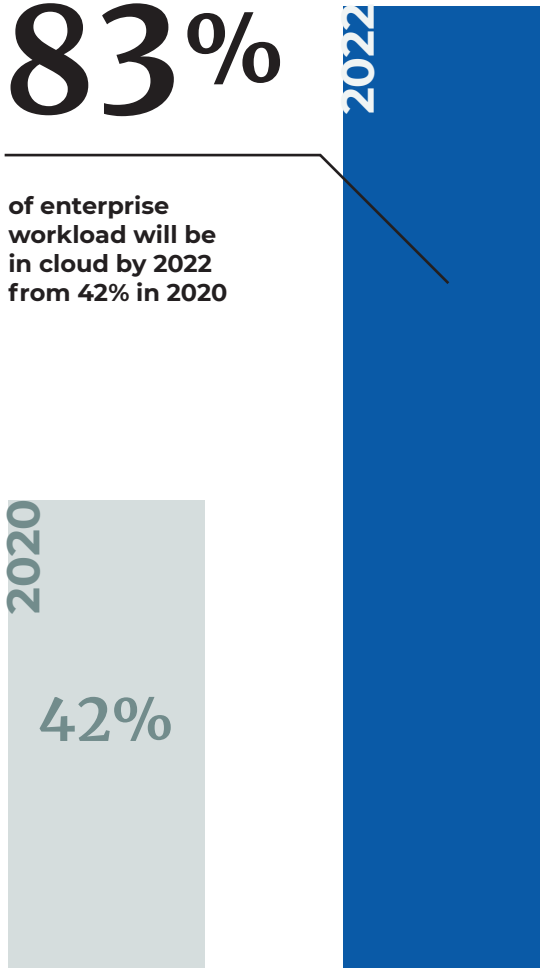
Discovery & preclinical research benefits the most from cloud solutions in bio-pharma manufacturing, with

60%

of the cloud computing market

83%

of enterprise workload will be in cloud by 2022 from 42% in 2020

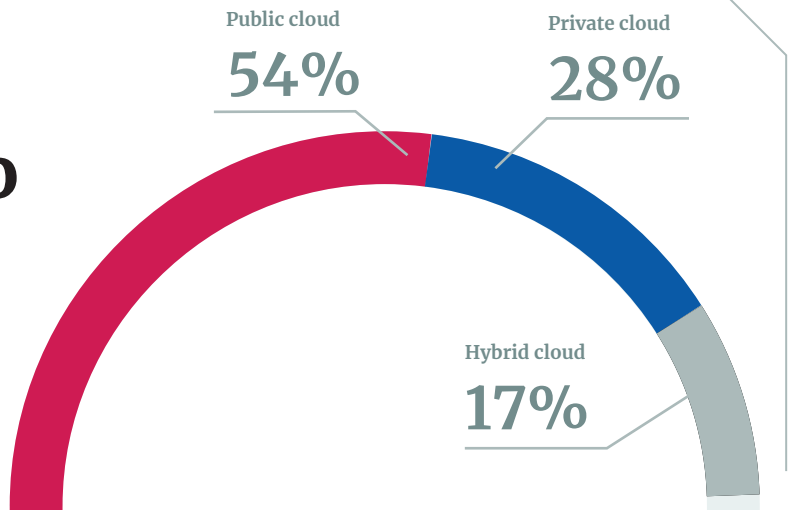


Cloud market by deployment type

Hybrid cloud model grows with the highest CAGR

24.9%

amongst deployment models while public cloud holds 54% of market share in 2020



Digital technologies have enabled companies to generate opportunities to support their competitive advantages.

Technological innovation in organizations has always been seen as a strategic way to create powerful business processes to further enhance competitive advantages. Cloud computing services can provide smaller companies with access to information and communication technology (ICT) resources, including both hardware and software, that were not previously available to SMEs. Cloud computing can minimize any strategic disadvantages SMEs face in being able to leverage ICT to increase internal operational efficiencies and save costs. Hence, from a commercial perspective, this novel environment enabled by ICT gives SMEs the opportunity to compete with large organizations on a more level playing field. The rapid growth of cloud computing service providers and the increasing year by year adoption by organizations can be seen as a paradigm shift making cloud computing a subject of great interest in both industry and academia.

That is far more than trust. Biotech and pharma see new opportunities for biology, genomics, and drug development thanks to cloud computing.

20% **of pharma organizations will make the most significant investment in implementing hybrid cloud management software until the end of 2021.**

83% **of the enterprise workload will be in the cloud by 2022. In 2020 53% remained in corporate data centers.**

23% **of CAGR is expected for global market for cloud computing in cell biology, genomics and drug development.**

Selected key pharma & biotech players using cloud

Bristol Myers Squibb™ · Pfizer · AstraZeneca · MERCK · illumina · NOVARTIS · MERCK · ThermoFisher SCIENTIFIC

There is no one correct answer to the question, “Which kind of cloud should we adopt.” Every enterprise has its own needs and seeks the best solutions.

Public Cloud

The infrastructure and other critical data exist on the cloud provider premises and are managed solely by the cloud provider.

Market value of EUR 1.2 BLN (2020) growing with 22.8% CAGR 54% market share.

- fast and secure IoT data collection
- simplifies the process of access, analyzation and collaboration
- make use of data from manufacturing equipment and data historians with secure IoT, cloud-based data lakes, and AI/ML

Private Cloud

Wholly dedicated to a single organization and is specially designed to meet that organization’s specific requirements

Market value of EUR 664 MLN (2020) growing with 23.9% CAGR 29% market share.

- infrastructure can exist on or off the premises of the cloud provider
- the platform can only be managed by the organization itself

Hybrid Cloud

A combination of public and private cloud that allows for handling any excess workflow with public cloud without sharing all data

Market value of EUR 373 MLN (2020) growing with 24.9% CAGR 16% market share.

- computing power and flexibility of the public cloud while maintaining data on-premises
- keeping business-critical applications safely behind a company firewall
- scalable and cost-efficient methodology to address the growing big data in the life science

Opportunities

Cloud computing for biotech and pharma is a game-changer in many areas, from early-stage research to drug development and commercialization. Now it's hard to imagine developing personalized medicines or productive big-data analytics without the cloud.

Despite all profits, cloud computing could be challenging. Especially for regulated industries, security issues could have dangerous implications. Moreover, the market still seeks experts who understand both cloud and biotech demands.

Growing cloud adoption...

- **Increased Data Connectivity & Collaboration**
- **Improved support access & support cost efficiency covers ~ half of the cost of digital solutions**
- **Increased Flexibility & Scalability**
- **Faster Processing & Transferring**
- **Improved Security**
- **Hardware Requirements "bypass"**

...or hybrid deployment model as the transitional measure

The enterprise focus on cloud computing will shift to cloud-native computing*

In 2021 we will see more enterprises embarking the journey to cloud through hybrid and multi-cloud strategy*

*Sources: BCC Research Cloud Computing in Cell Biology, Genomics and Drug Development

Risks

What insecurities are slowing down the cloud adoption?

Identity and access management

Commonly used identity management (based on unique usernames and passwords) is considered insufficient

Data protection

With the growth of cloud complexity of networks has increased (increasing entry points), companies must adjust by introducing complex security policies

Incident response

Life sciences organizations must be able to rely on their cloud providers to respond to attacks with immediate containment and notification, as well as continuity of service

Data localization

Regulations for data localization (local storage and processing of data) may require data to be stored on servers in operating country hindering company's possibilities

Lack of trust

Life Sciences and Healthcare environment there is a general lack of trust in cloud solutions. Generally, the larger the company - the greater the concern for security and privacy

Cloud Adoption Dynamics

Navigating the dynamics of cloud computing adoption is an ongoing the challenge for many organizations. It is clear that cloud computing offers a cost-effective mechanism for companies of all sizes to leverage the business value of their IT systems. Enterprises need to be confident that they are investing in technology that is trustworthy and that the environment is set up to fully embrace and leverage this technology without complexities. This can help promote organizational innovation that is equipped with the right capabilities, while being carefully aware of the risks and associated barriers to facilitate the adoption process. That way, companies can maintain the continuity and sustainability of their business.

Drivers		Restraints	Opportunities	Challenges
Big data in the life science industry	Need for in-depth insights from data to gain competitive advantage	Reluctance to shift to the cloud	Analytics in personalized medicine	Security and privacy concerns
Adoption of analytics solutions in clinical trials	Demand to gain actionable insights from big data	Complexity in extracting valuable insights	Big data analytics to increase R&D productivity	Lack of skilled personnel
Improvement of data standardization	Growing adoption of private cloud	Data privacy and security concerns	Growing demand of SMEs	Resiliency, cloud availability, and information lifecycle management
Need for self-driving cloud databases	Growth in data due to digitalization and automation	Lack of analytical skills	BDaaS solutions to enhance RoI and decision-making	Managing regulatory and compliance policy needs
Simplified access to data in departmental silos, and legacy systems	Demand for dashboards for data visualization to enhance business decisions	High implementation costs	Increasing demand for Internet of Things devices	Data integration in the life science ecosystem

02

Digital Tools in Bio-Pharma Manufacturing

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Digital Tools in Bio-Pharma Manufacturing

Biopharmaceutical therapeutics make it possible to treat many diseases that previously could not be treated. Biopharmaceutical drugs are quite expensive to produce in comparison to small-molecule drugs. On average, it costs about $1/day to produce a small-molecule drug, and generic drugs cost even less. In contrast, **the average cost of a biologic drug is about $22/day.**

The pricing issue is a primary concern. Regulatory constraints from regulators are also a challenge. The need to transform legacy systems and obtain validation for new systems or processes requiring modification is an additional challenge. To increase manufacturing efficiency, reduce downtime, and accelerate time to market, biopharmaceutical manufacturers are turning to modern manufacturing methods, including digital technologies.

The biopharmaceutical market is rapidly adopting Industry 4.0 technologies. Industrial control systems and automation have been a part of manufacturing platforms for a long time. Industry 4.0 has sparked a new revolution by IT and OT. The highly regulated nature of the biopharmaceutical industry is carefully incorporating innovative digital technologies.

Biopharmaceutical manufacturers can benefit in several ways by implementing IIoT in manufacturing, as it can **increase process efficiency, ensure manufacturing and entire supply chain agility, provide tracking, visibility, and predictive maintenance, and save regulatory compliance time.** The long-term benefits offered by continuous manufacturing and digitization in bioprocesses are driving this market.

Let's explore the main categories of digital solutions supporting modern manufacturing.

Łukasz Paciorkowski
CEO, A4BEE

Laboratory Informatics market is projected to reach **€3.44 billion by 2025, with CAGR of 7.5%**

€3.4 BLN

+7.5%
CAGR

2022 — 2025

Next to industry specific solutions we see **traditional technology players** with more general - **enterprise systems.**

In most cases **services account for the majority of generated revenue** compared to software, highlighting the importantce of **the service continuity.**

Majority of the solutions uses **on-premise** deployment model, but **cloud has the highest CAGR** in most cases.

To maximize the benefits of digital solutions in manufacturing an **effective integration of several systems** is required.

Customers seek **seamless data flows** between systems and though approaching it is a difficulty for all providers – those who are able to achieve it **gain a business edge**.

Integration of systems also **boosts the cloud deployment** model in digital solutions.

Benefits of integrated solutions

Improved compliance with a single point of entry for data and faster reporting

Improved workflows in the facility and **easy retrieval of data**

Reduced costs of using multiple **software** solutions or systems

Accelerated **validation process** and **quality assurance** of products

Researched digital solutions by application

Laboratory Software

Industry specific solutions to improve workflows in laboratory environment, with the special attention for regulatory compliance

Projected to reach **€3.44 billion by 2025**, at a **CAGR of 7.5%.**

LIMS

Enterprise Systems

More generic solutions for managing resources in an enterprise

ERP

MES

Top digital tools used in bio-pharma manufacturing

trends on solution deployment model

	Market Value EUR BLN 2020		2025	Companies Engagement
PLM Product Lifecycle Management	45.4	7.8%	66	SAP, ORACLE, DASSAULT SYSTEMES, SIEMENS, AUTODESK
ERP Enterprise Resource Planning	37.7	8.2%	59.6	SAP, ORACLE, Microsoft, sage, infor
Environmental monitoring systems	16.3	6.8%	22.6	PerkinElmer, Agilent Technologies, ThermoFisher SCIENTIFIC, DANAHER, SHIMADZU
DCS Distributed Control Systems	15.5	5%	19.5	EMERSON, Rockwell Automation, Schneider Electric, SIEMENS, ABB
MES Manufacturing Execution Systems	9.9	7.5%	12.37	SAP, Rockwell Automation, DASSAULT SYSTEMES, SIEMENS, ABB
QMS Quality Management Systems	6.5	9.7%	10.2	SAP, MasterControl, Microsoft, Honeywell, PSCSoftware
Data Analytics Analytics as a service	4.2	19.8%	12	IBM, ORACLE, Microsoft, Google, aws
Data / Process Historian	0.9	5%	1.0	EMERSON, GE Healthcare, Schneider Electric, SIEMENS, ABB
LIMS Laboratory Information Management Systems	0.8	12%	1.4	LABWARE, Agilent Technologies, ThermoFisher SCIENTIFIC, Abbott, LabVantage
EBR Electronic Batch Record		N/Q		EMERSON, Rockwell Automation, Schneider Electric, Honeywell, ABB

03

Research Methodology

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Methodology

Methodology used for research of each domain in scope covers the following 6 steps:

01 IDENTIFY DATA SOURCES

02 STUDY MARKET STRUCTURE

03 IDENTIFY PLAYERS, TECHNOLOGY & SOLUTION

04 INTEGRATION OF INFORMATION

05 OBJECTIVE OF THE RESEARCH

Qualitative and quantitative overview of digitization in bio-pharma manufacturing space

06 MARKET SIZE

Market size was calculated, if possible, for the following segments: Life Science, Pharma, Biopharma, Biotech, Healthcare, Manufacturing.

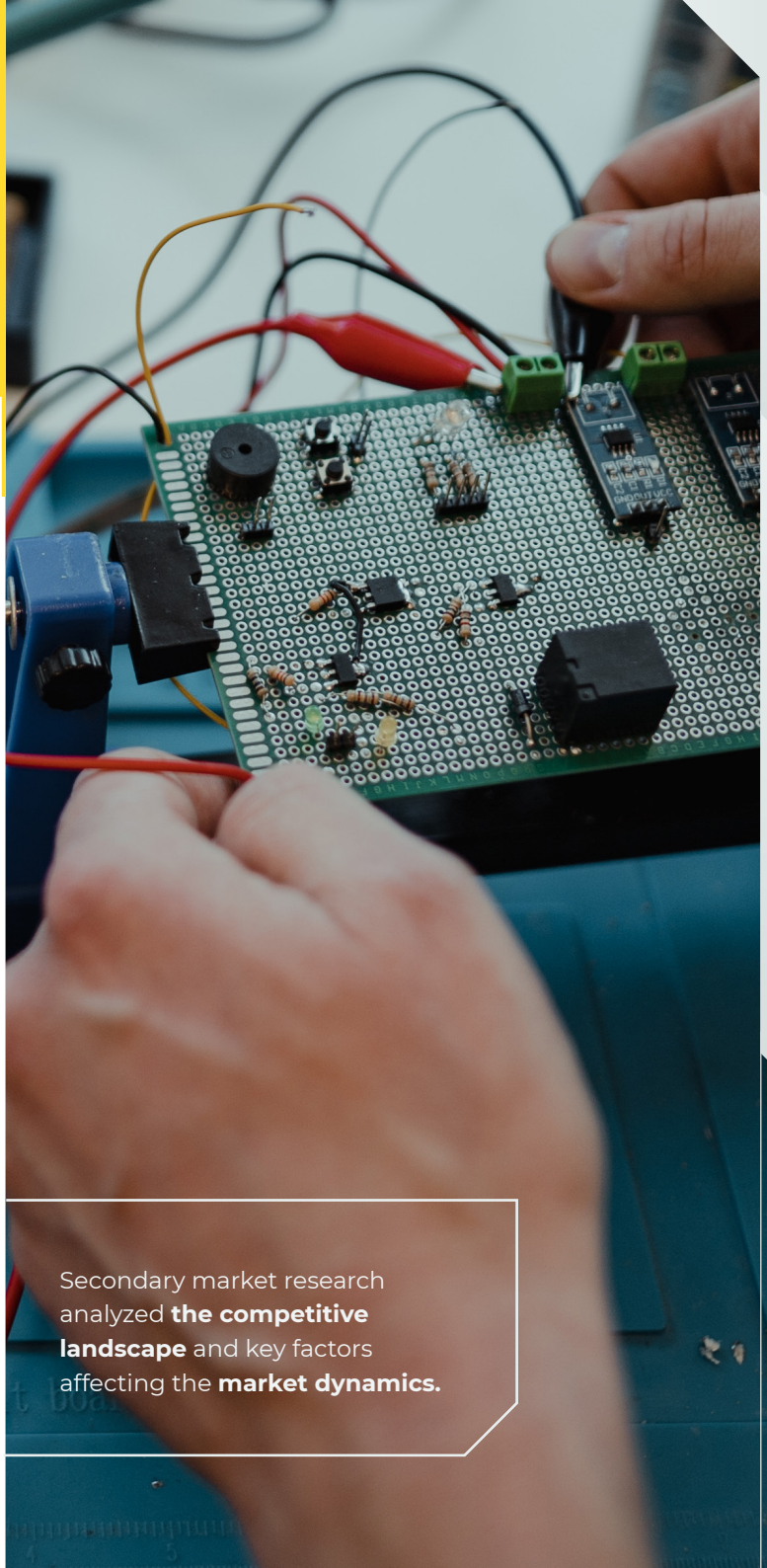
It was not always possible to gather data for Biopharma manufacturing segment specifically

Secondary market research has also been conducted to identify:

Segmentation Types

Industry Trends

Key Players



Secondary market research analyzed **the competitive landscape** and key factors affecting the **market dynamics.**

Research Data & Data Sources

RESEARCH DATA

This research incorporates the extensive usage of secondary sources: websites; market reports; companies' public information; products information and documentation, annual reports, press releases, and investor presentations of companies; white papers, certified publications, and articles from recognized authors;

MARKET SIZE

- Markets and Markets reports
- IDC reports
- BCC Research

REVENUE OF COMPANIES

- Annual reports
- Company Websites

OTHER QUALITATIVE INFORMATION

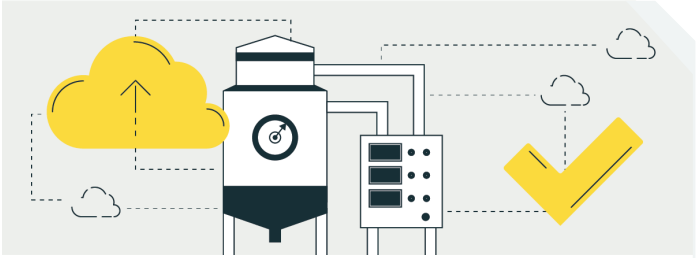
- Press Releases
- Journals
- Magazines

DATA SOURCES

Market size and growth prediction data are based on reports published by MarketsandMarkets, BCC Research, and IDC

MARKETSANDMARKETS™ BCC Research IDC

More insights about cloud computing



Don’t panic and get ready for cloud migration

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Top cloud security standards and governance frameworks

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Team

Agnieszka Malawska

Lead Researcher, Biotech & Pharma Consultant

Iwona Ignaś

Researcher Lab Leader

Karolina Marzantowicz

Chief Of Growth Business & Technology Solutions

Tomasz Kopacki

Chief Technology Officer

A4BEE

A4BEE Sp. z o.o.
Muchoborska 8,
54-424 Wrocław, Poland

REGON: 380773390
NIP: 8992847613
KRS: 0000739969

www.a4bee.com
hello@a4bee.com