Business Case Study: Accelerating Drug Discovery and Market Intelligence with AI at PHARMATECH

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Company Profile

PHARMATECH is a pharmaceutical company headquartered in Barcelona, focusing on the development of biotechnological solutions for autoimmune diseases. The company has 15 active research projects, 3 drugs in clinical trials, and operates in 10 countries across Europe and Latin America. Last year, PHARMATECH reported 280 million in revenue.

Departmental Focus: R&D and Market Intelligence

The Research and Development (R&D) department is responsible for early-stage drug discovery and clinical trial design. The Market Intelligence unit analyzes competitor pipelines, scientific publications, and public health trends to guide strategic decisions.

Challenge

The company wants to reduce the time and cost of drug discovery while identifying unmet needs and high-impact launch strategies. AI is expected to support molecular screening, literature analysis, and market prediction.

Proposed AI Integration

PHARMATECH proposes an AI-driven approach in two key areas:

- **Drug Discovery:** Use AI models to predict molecular interactions and repurpose existing compounds for new indications.
- **Market Intelligence:** Analyze global databases of clinical trials, social media, and publication trends to forecast competitive activity and patient needs.

Implementation Plan

- **Q1:** Integrate molecular and trial data; identify relevant AI partners
- **Q2:** Train classification models for molecule-target interactions; deploy NLP on PubMed articles
- **Q3:** Combine insights into internal drug pipeline and launch planning
- **Q4:** Build dashboards for scientists and strategic analysts

Expected Impact

- Reduce early-stage screening time by 40%
- Detect 3 new therapeutic opportunities from existing compounds
- Generate 20% more accurate competitor forecasts using unstructured data

Fictional Financials

Balance Sheet – End of Year (in millions)

Assets	**Current Year**	**Previous Year**
Cash	30	20
Accounts Receivable	60	50
R&D Capitalized Assets	180	165
Intellectual Property	90	85
Total Assets	**360**	**320**
Liabilities & Equity		
Accounts Payable	40	38
Long-term Debt	120	110
Deferred Revenue	30	25
Shareholder Equity	170	147
Total Liabilities & Equity	**360**	**320**

Profit and Loss Statement (in millions)

Item	Current Year	Previous Year
Revenue	280	255
Cost of Goods Sold	110	100
Gross Profit	**170**	**155**
R&D Expenses	90	85
SG&A Expenses	40	38
Operating Income	**40**	**32**
Taxes	8	6
Net Income	**32**	**26**

Data Challenge: AI-Driven Drug Discovery and Market Insight

PHARMATECH is seeking innovative solutions to process both structured and unstructured data to inform research and business strategy.

Available data includes:

- **Structured:** Molecular compound libraries, clinical trial metadata, patent data
- **Text:** Scientific articles, clinical trial reports, social media mentions
- **Images:** Microscopy data and molecular structure images
- **Time Series:** Disease incidence data across countries and time

Objectives: Students should:

1. Select a problem to address: e.g., molecule-disease matching, competitor pipeline analysis, emerging health threats
2. Choose relevant AI techniques: classification, NLP, CNNs for image analysis, topic modeling, forecasting
3. Propose a complete preprocessing pipeline for each data source
4. Recommend Python libraries (e.g., `RDKit`, `scikit-learn`, `transformers`, `BioPython`, `Matplotlib`, `TensorFlow`)
5. Suggest a method for visualizing and communicating results to R&D or strategy teams

Bonus: Develop a dashboard mock-up for a drug discovery platform showing candidate ranking and opportunity scores.

Discussion Questions

1. What are the risks of using AI-generated predictions in clinical decision-making?
2. How can PHARMATECH validate AI models with limited medical ground truth?
3. What privacy and data ethics considerations should be addressed in this context?
4. How could AI shift the competitive landscape in pharma?

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