

Biotherapeutics: Manufacturing of Non-Patented Human Vaccines

Investment pitchbook

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Executive Summary

Attractive Investment Destination

- **Pakistan** is emerging as a **regional powerhouse**, with a **reformed economy** (inflation stabilized at the lowest level in the past 50 years and GDP expected to cross USD 3.3T by 2050) and **vibrant talent** (7th largest global workforce, with 64% of the workforce under 30)
- Investors can count on **strong government support**, including **accelerated licensing**, **tax incentives** under industrial development schemes, and **demand support**, through national immunization programs




Significant Reliance on Imports Impacting Health Security

- **Vaccine demand** in Pakistan is **rising due to secular trends**, such a growing child population and aging demographics, as well as nationwide immunization programs
- Despite an advanced pharma ecosystem, Pakistan **imported over USD 300 million in human vaccines in 2024** (expected to reach ~USD 480 million by 2030), **~80% being non-patented products**
- The **GAVI subsidy**, currently covering ~50% of national vaccine demand, is **expected to end by 2030**, further increasing the import burden and creating a **strong case for local manufacturing investment**

Viable and Attractive Opportunity

- Investors can develop and operate a **manufacturing plant focused on non-patented human vaccines** targeting mainly **local import substitution**
- **The project cost is estimated at USD 150Mn** for a 10 million vial capacity focused on **higher-value vaccines** (e.g., PCV-13, IPV)
- Local banks can provide up **70% debt financing for construction**, with an expected **22-23% IRR for equity investors** over a 20-year operating horizon




Pakistan: Your Pharma Destination

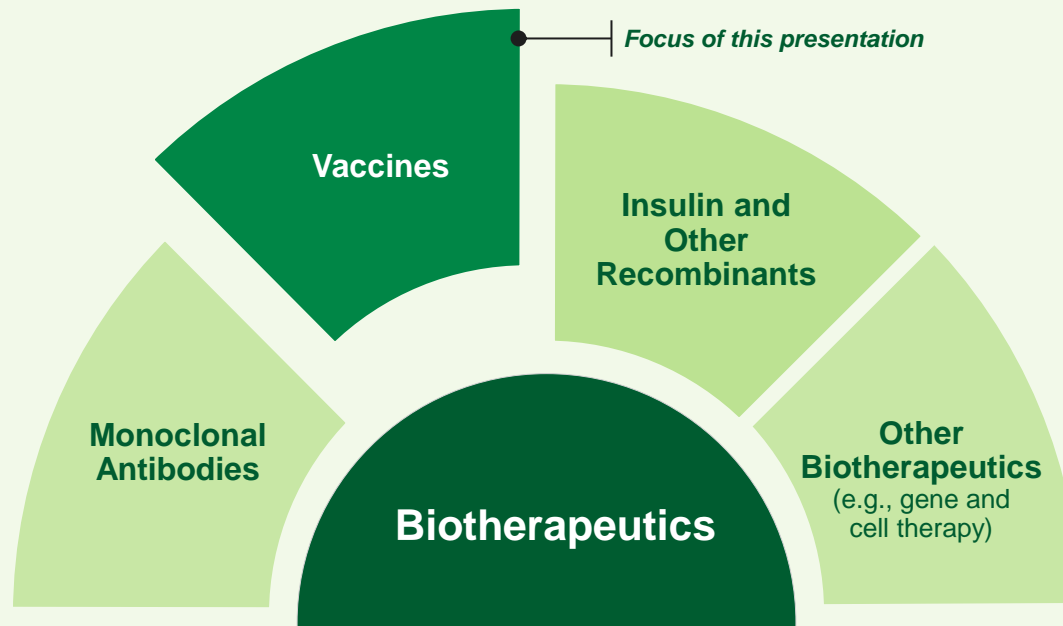
Pakistan Value Proposition						
Reformed Economy 	USD 3.3Tn¹ Expected GDP in 2050 (from USD >410Bn ² today)	B- Improved Credit Rating ³ from CCC-	Top 10 In Business Entry Regulations ranking ⁵	Stabilized Inflation At lowest levels since 1968 ⁶	Stabilized Currency Achieved since 2023 in coordination with IMF	Special Economic Zones (SEZs) Robust fiscal and trade incentive packages
Vibrant Demographics and Talent 	255 million Large and growing population ⁸	64% Population younger than 30 ⁷	7th largest Global workforce ⁸	2 million University students enrolled every year ⁹		
Advanced Pharma Ecosystem¹⁰ 	700+ manufacturers / 10+ MNCs¹¹ Operating in Pakistan	100+ thousand People employed in the pharma sector	100% YoY Growth In Pharma exports, among which insulin products to Asia, Africa	>80% of children vaccinated in Pakistan On key routine childhood immunizations	70% local production Of simpler chemicals (oral solids/liquids), setting strong foundation	

1. Goldman Sachs; 2. National Accounts Committee; 3 Fitch Ratings; 4. Bloomberg, 84% in PKR; 5. World Bank's B-READY assessment; 6. State Bank of Pakistan; 7. United Nations; 8. CIA World Factbook; 9. Higher Education Commission; 10. Pakistan Pharma Manufacturers Association; 11. Multinational corporations

Pakistan is ready to lead regional biotherapeutics manufacturing and trade

Opportunity Overview

- 
Import substitution potential of large unmet domestic demand
- 
Local CMO / fill-finish and biosimilar partnerships given local availability of cost-efficient technical and manufacturing capacity
- 
Export potential to regional markets and global low-income markets through established trade relationships



Competitive Advantage

Local Captive Demand

\$1.9B in Biologicals imports between 2022-2024

Key Logistics Link

Established Pharma export supply chain to 60+ countries and preferential trade access through GSP+ (EU, UK), CPEC (China), ECO, OIC, SAFTA

Enabling Environment

Sector reforms with enabling policies (e.g., Pharma Export Strategy) and strong manufacturing base, including WHO-certified plants



Investors have an opportunity to develop and operate a manufacturing plant focused on non-patented human vaccines

Opportunity overview and key highlights

Opportunity Description



Develop and operate a manufacturing plant focused on non-patented human vaccines, focusing on fill & finish and secondary packaging and gradually integrating upstream across the supply chain

Project detailed next

High-Level Opportunity Facts



A Project Details



Non-Patented Human Vaccines



**100 Mn Doses
10 Mn Vials¹**



International Certification (cGMP)

B Supply-Demand Gap

Imports reliance for almost entire local demand (imports USD 600+ Mn between 2022-2024); local supply limited to small players

C Investment Model

Private sector investment with strong government support

Return Profile

IRR: 22-23%²

D Run-rate Revenues

PKR 79-80Bn³

Estimated Project Cost

USD 150Mn^{4,5}
(70:30 debt to equity structure)

Value Proposition



Opportunity to be a First Mover

Focus of this opportunity



First-mover advantage in an underserved market, with potential to establish manufacturing operations and gradually integrate upstream across the supply chain



Established Client Base: Diverse local demand of vaccines from hospitals and government agencies



Government as a potential vaccine buyer, through its Expanded Program on Immunization (EPI)⁶



Skilled Technical Talent: Large pool of 100k+ pharma professionals; demonstrated capabilities on complex vaccines (e.g., Covid vaccine at competitive prices)



Strong Government Backing: Robust policies and incentives enhance project viability



Potential local partners with multiple companies already operating in Pakistan (e.g., DOW, Amson, National Institute of Health)

1. Considering an average of 10 doses per vial
 2. In local currency; over 20 years of operations (detailed in Business Case section)
 3. Year 10 of operations
 4. Excludes working capital requirement (detailed in Business Case section)
 5. At current USD exchange rate (PKR 280.6)
 6. Under the Ministry of National Health Services, Regulations & Coordination (MoNHSR&C)
 Source: Expert input, DRAP, Pharma Manufacturers Association



A. The plant will manufacture non-patented human vaccines with generalist production capabilities, focusing on fill & finish and secondary packaging in the value chain

Project details (NOTE: Plant capacity, revenue and cost per vial will depend on final vaccine chosen for production)



Offering

- Generalist production capabilities (i.e., plant equipped to manufacture multiple types of non-patented vaccines)
- Manufacturing plant to include proper segregation and changeover protocol to handle multiple vaccine types

✓ *Potential to add adjacent biotherapeutics production lines to expand offering*



Technical Specifications

- Capacity: ~100 Mn doses per year (~10 Mn vials per year)
- International cGMP certification enabling potential export activity



Targeted End-Users/Buyers

- Hospitals and government agencies procure vaccines (also with external funding) for immunization campaigns (mainly for the Expanded Program on Immunization)
- Private sector incl. pharmacies and hospitals buy vaccines outside the EPI schedule (e.g., influenza)

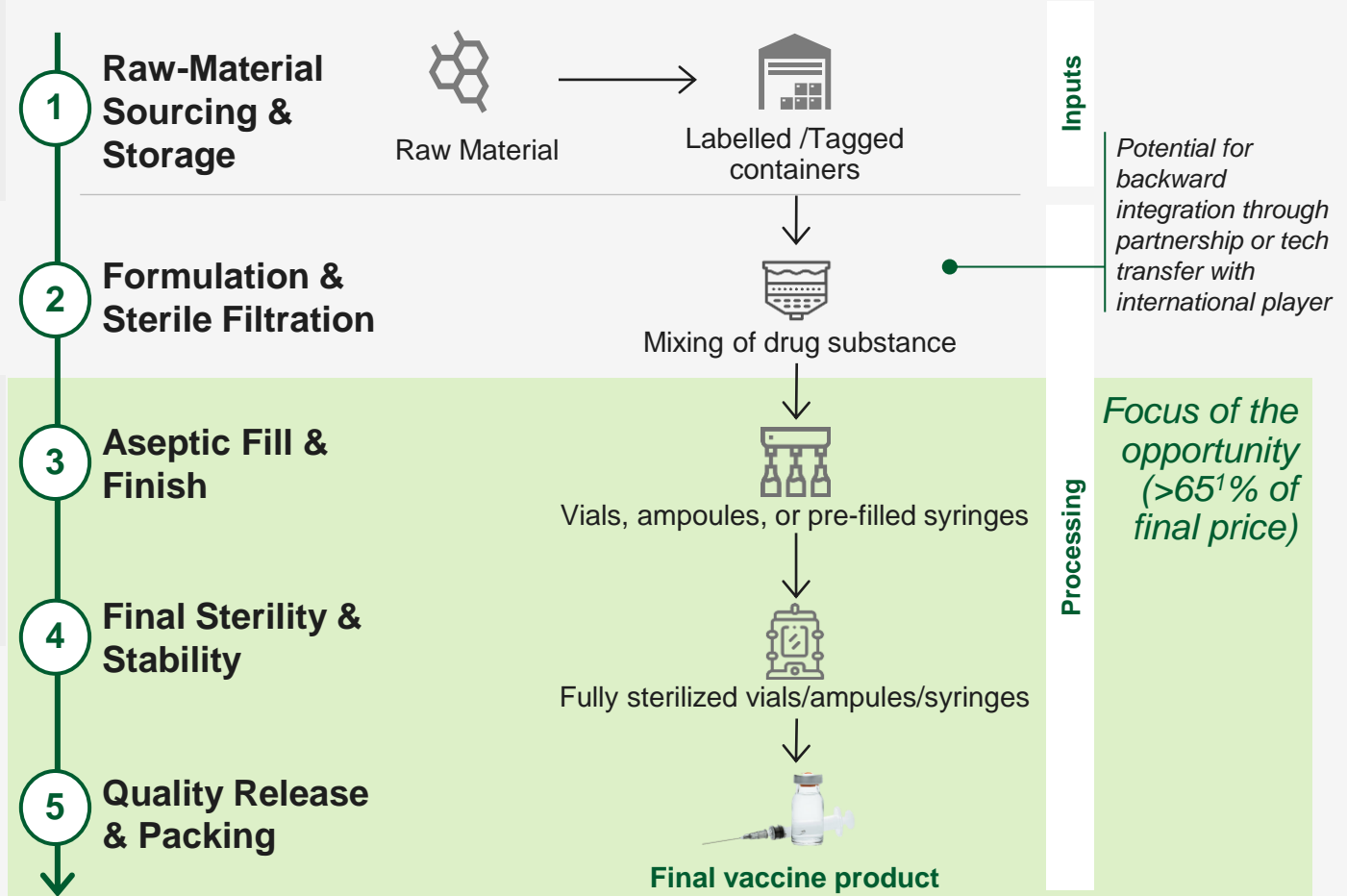


Location

- In close proximity to Pakistan's main population hubs: Punjab, KPK, Sindh, Islamabad
- Targeted special economic zones

✓ *Potential to partner with NIH and use current production facilities in a brownfield project*

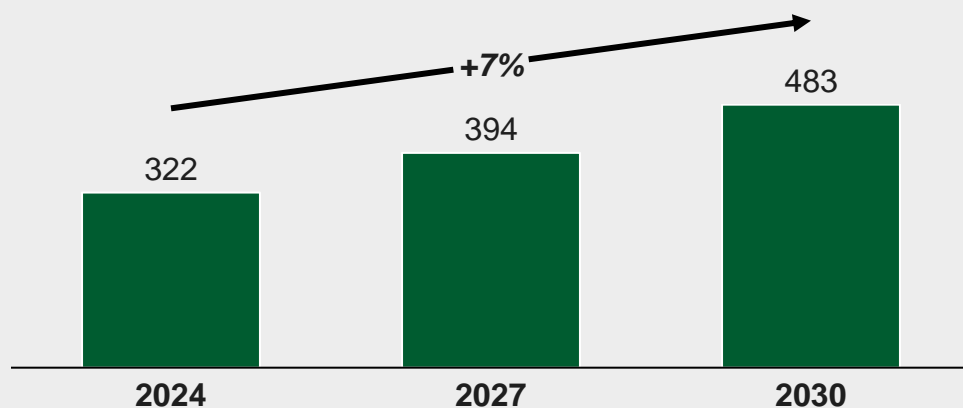
Vaccines Manufacturing Schematic Overview



B. The opportunity aims to leverage Pakistan's growing Pharma market and the Government's support to reduce import reliance for human vaccines

Vaccines Demand Tailwinds

Human Vaccines Imports in Pakistan (USD Mn)¹



- USD 600+ Mn of imported vaccines between 2022-24 to satisfy local demand
- ~20% of imported vaccines are patented products, limiting their potential for immediate localization due to intellectual property restrictions
- Local vaccine production remains minimal, with the vast majority of domestic demand met through imports
- GAVI vaccines subsidies to end by 2030, which will substantially increase the Government's burden to acquire vaccines vaccine purchases
- Low priced (<0.3 USD/dose) vaccines (e.g., BCG, Diphtheria) account for a small share of imports (<10% in value); PCV-13, IPV, and Pentavalent vaccines hold >40% of imports value

Demand Drivers

Large Market



- Growing Demand: Pharma market in Pakistan to reach **USD 6.7Bn by 2030**, driven by rising medicine consumption among **250+ million people**
- Pakistan **government as key vaccine buyer** (~80% of market spend) for the national **Expanded Program on Immunization** (e.g., Polio, BCG) supported by international donors (e.g., Gavi³)
- **Private sector**, incl. hospital, pharmacies, etc. (~20% of market spend) **cover vaccines outside the EPI schedule** (e.g., influenza)
- Global vaccines upside with **market projected to grow** from USD 88 Bn in 2024 to USD 152 Bn by 2033 at 7.8% CAGR²

Increased Vaccines Reliance



- **Growing infant and child population, aging demographics, and nationwide immunization programs** are driving the demand
- **Frequent outbreaks of vaccine-preventable diseases** (e.g., Polio), enhanced **education** and **awareness** are **improving immunization rates**

Global Trends



- Global Supply Chain Shift: Rising protectionism pushing **pharma reshoring**; Pakistan positioned as a regional hub connecting Middle East and Asia

C. Investors will be supported by public and private parties in a robust Pharma ecosystem



Drug Regulatory Authority of Pakistan (DRAP / MNHRC)

- Responsible for policy framework and incentives
- Offers regulatory and technical support, as well as capability-building for the industry
- Supports investors in fast-tracking required approvals for vaccines manufacturing



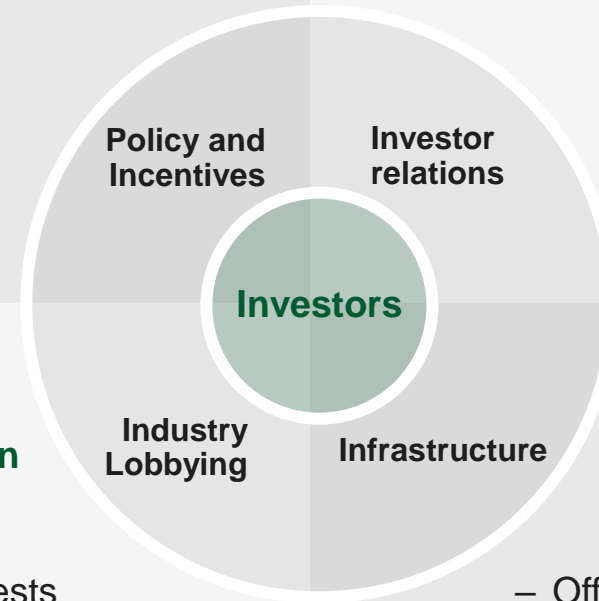
Special Investment Facilitation Council (SIFC)

- Facilitates and fast-tracks foreign and domestic investments
- Provides a streamlined, one-window operation for investor support and coordination across government entities



Pakistan Pharma Manufacturers Association (PPMA)

- Represents pharma sector interests
- Focuses on improving industry competitiveness locally and abroad
- Promotes domestic manufacturing of vaccines



Special Economic Zones

- Offer fiscal and trade benefits
- Ensure robust infrastructure (e.g., electricity stability)



C. Investors will benefit from the Government support to create an attractive business and regulatory environment

Key opportunity enablers and incentives

Ease of Doing Business

- Market prices on majority of products (only WHO essentials are regulated)
- Ongoing review and simplification / deregulation across sectors
- PPRA¹ has rolled out an e-procurement platform improving supplier access and transparency
- Fast-tracked regulatory approvals for essential vaccines, streamlining market entry for key injectable products



Demand Support

- Government as a potential vaccine buyer, through its Expanded Program on Immunization (EPI), offering a large and predictable demand



Tax & Fiscal Incentives

- Tax breaks and tax holidays
- Reduced import duties on vaccine required machinery and raw materials (sales tax reduction to 1% and 0% customs duties on select input materials and machinery)
- EXIM Bank of Pakistan mandated to provide project financing and working capital financing for exports and import-substitution projects



Infrastructure Incentives

- Special Economic Zones
- Guaranteed electricity stability
- Industrial infrastructure / land incentives
- *(Planned) Pharma Economic Zone*
- Export Processing Zones (EPZs) and export-oriented incentives (e.g., duty exemptions)



Additional incentives to be included in upcoming **vaccine manufacturing policy** that is being developed to support indigenous manufacturing, enhance vaccine self-reliance and improve regulatory frameworks

1. Public procurement regulatory authority
Source: DRAP, SIFC, P3A, other Pakistan Government entities

D. Consequently, investors can expect 22-23% IRR over the coming 22 years, with USD 150Mn in estimated CAPEX and 70% debt financing

Estimated project financials and investment case











(Figures provided are estimations based on available information)

Business Case			
Return profile	Expected IRR	22-23% ¹	<ul style="list-style-type: none"> – 2-year development period – Computed based on 20-year operations – Payback period impacted by development period and cash outflows for interest in first 10 years of operations
	Payback Period	10 years ²	
Operations	Revenues	PKR 79-80Bn ³	<ul style="list-style-type: none"> – Initial capacity utilization of 40%, ramping up to 90% over 5 years of operations – Assumes a plant capacity of 100Mn doses (10 Mn Vials⁷) per year and an average price of PKR 420 per dose (PKR 4.2k per vial⁶) based on import data (weighted average price) – Commercialization of a mix of live (e.g., BCG) and non-live vaccines (e.g., PCV-13, IPV), in line with current imports mix
	EBITDA Margin	20% ³	<ul style="list-style-type: none"> – Costs assumed: COGS, utilities, labor, QC and testing, annual maintenance, marketing and sales, and other costs – Operations reflecting additional maintenance and cleaning / sterilization costs related to the production of live and non-live vaccines
	NOPAT	PKR 10-11Bn ^{3,4}	
Development	Construction Cost ⁵	PKR 42Bn ⁵ (USD 150Mn ⁶)	<ul style="list-style-type: none"> – 70% financing of construction – 12-year loan duration (including initial 2-year grace period), 12.5% interest rate (based on offered local bank financing terms)
	Equity Input: Construction	PKR 12.6Bn (USD 45Mn ⁶)	– 30% equity required for construction
	Equity Input: Working Capital	PKR 1.3Bn (USD 4.5Mn ⁶)	– 30 days ⁸ of OPEX required in first operating period

Business case reflecting medium-to-high value vaccines, with higher project cost; Investor can consider lower capex projects (USD <30M) for lower end vaccines (<0.3 USD per dose), while delivering similar returns (*details on vaccine values in appendix*)

D. Support mechanisms are in place to support the mitigation of potential risks impacting the investment case

Key investment risks and mitigation measures

Risk type 	Description 	Degree of Risk 	Investor Mitigation Actions 	Public Sector Support 
Demand/ Revenue 	Risk of not achieving projected revenues or sales targets due to lower demand or competitive pressure	Low – Significant local supply imbalance in Pakistan given limited local vaccine production capabilities; limited local competition	Focus go-to-market on securing contracts with retail and public health entities to ensure demand	Support demand through strong enforcement of regulatory requirements (i.e., localization requirements)
Macroeconomic Conditions 	Risk of inflation or currency depreciation affecting profitability	Medium – Recent track record of inflation decline (at lowest levels since 1968 ¹) pointing to stabilization	Arrange local currency financing for the project and enforce USD-indexed pricing	Facilitate access to local currency loans
Supply Chain Risks 	High reliance on imported raw materials and inefficient port handling can delay deliveries	Low – Pharmaceutical supply chain routes, especially with China and India, are well established given the magnitude of current imports and the size of the industry	Diversify suppliers and build contingency inventory levels of essential raw materials	Ensure fast customs pass-through to avoid spoiled materials; Expand regional trade agreements
Unreliable and Costly Electricity 	Unreliable and elevated electricity tariffs affecting investment profitability	Low – Electricity prices in Pakistan are above regional ones; however, the government is engaged in several infrastructure projects aimed at power supply stabilization, which helps bring cost down	Explore renewable energy integration to offset grid consumption on the long term	Provide more cost-effective electricity industrial tariffs to ensure investment attractiveness
Regulatory / Legal 	Risk of sudden policy changes impacting contract or taxes	Low – Recent reforms and deregulation trend suggesting commitment to private sector partnerships	Include independent jurisdiction (e.g., UK) in contract; include robust stabilization and early termination clauses in concession contract	Offer legal protections and enable international arbitration where applicable

Connect with SIFC to learn more



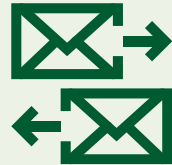
Website

<https://sifc.gov.pk/>



SIFC E-Service Gate

<https://ticketinghub.sifc.gov.pk/>



Email

invest@sifc.gov.pk



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APPENDIX



A. Pakistan has a track record of successful Foreign Direct Investments across sectors

Examples of Foreign Direct Investment (FDI) projects in Pakistan

FDI projects (non-exhaustive)		
<p>Hangzhou Newsea (China) USD 50-70Mn </p> <ul style="list-style-type: none"> – Joint venture (ETACI Limited) to expand API manufacturing capacity in Pakistan – USD 50–70Mn investment to add 20–30 new APIs, leveraging Citi Pharma’s existing infrastructure; commercial operations expected within 12–18 months 	<p>AD Ports (UAE) USD 220Mn </p> <ul style="list-style-type: none"> – 50 year concession agreement to manage, operate and develop the Karachi Gateway Terminal – USD 200Mn investment in infrastructure development by AD Ports in first 10 years 	<p>Al Mirqab Capital (Qatar) Power Construction Corp. (China)  USD 2.09Bn </p> <ul style="list-style-type: none"> – Construction of coal-powered power plant in Port Qasim, under build-own-operate (BOO) model – USD 2.09Bn investment, of which c.a. USD 500Mn in equity
<p>DP World (UAE) and National Logistics Corp. (Pakistan)  JV investment not public</p> <ul style="list-style-type: none"> – Joint venture (DP World: 60%) focused on road freight logistics approved – Follows MoU by DP World for the development of 50km freight corridor from Karachi Port to Pipri 	<p>Air Arabia (UAE) and Lakson Group (Pakistan)  JV investment not public</p> <ul style="list-style-type: none"> – Air Arabia enters joint venture with Pakistan’s Lakson Group to launch low-cost airline Fly Jinnah in 2022 – Operator certificate and license acquired 	<p>Other Announcements and MoUs (non-exhaustive)</p> <ul style="list-style-type: none"> – Reportage Properties (UAE): JV with Empire Holding Pakistan for USD 300Mn real estate development in Islamabad and Lahore – Emaar Group (UAE): JV with Giga Group Pakistan for USD 2.4Bn Crescent Bay real estate – Saudi Development Fund (KSA): Potential investment in mining infrastructure (USD 100Mn) – Manara Minerals (KSA): Exploring stake in Reko Diq copper and gold mine (USD 7Bn)









A. In addition, Pakistan has had previous success in setting up vaccines manufacturing plants through government support

Case Study

Overview

- In 2021, **CanSino** partnered with Pakistan’s **National Institute of Health (NIH)** to manufacture PakVac
- **PakVac** is a **locally manufactured, single-dose COVID-19** vaccine that is **formulated, filled and finished, and packaged** in NIH’s factory in Islamabad
- This project was successfully completed under a **tech transfer partnership**, with NIH funding and operating the facility and CanSino providing support

Tech Transfer Partnership between NIH and CanSino

Role	NIH  	CanSino  
Facility Ownership 	Owens and operates facility at NIH campus	N/A
Operations 	Conducts formulation, filtration, filling, sealing, QC, and packaging	Provided tech transfer and remote QA support
Technology Transfer 	Received formulation and production protocol	Supplied bulk concentrate and transferred manufacturing know-how
Financing 	Fully government-funded (GoP through NIH budget)	No capital investment; support via training & know-how

The factory is designed to manufacture 3 Mn doses per month, and managed to save USD 250 Mn yearly in vaccine imports for the government of Pakistan

B. Top Imported Vaccines in Pakistan

Top Vaccine Imports in 2022-2024 (<i>non-exhaustive</i>)		
Disease Tackled/ Type of Vaccine	WHO EML List?	Value (vs. PKR 420/dose average imported price)
Poliomyelitis Vaccine	Yes	Below
Measles + Rubella Vaccine	Yes	Average
Diphtheria-Pertussis-Tetanus Vaccine	Yes	Below
Rabies Vaccine	Yes	Above
Hepatitis B Vaccine	Yes	Below
Tetanus Vaccine	Yes	Below
Influenza Vaccine	Yes	Above
Meningococcal Meningitis Vaccine	Yes	Average
Hepatitis A Vaccine	No	Above
BCG Vaccine	Yes	Below
Pentavalent Vaccine	Not explicitly	Average
PCV-13 Vaccine	Yes	Above
IPV Vaccine	Yes	Above
Typhoid Vaccine	Yes	Average

D. Opportunity P&L

Extract from financial model

Preliminary numbers being validated; figures provided are estimations based on available information

Numbers in PKR	Year 1 ¹	Year 5 ¹	Year 10 ¹
Utilization	40%	80%	90%
Total Revenue	19,275,536,400	50,532,592,407	79,733,896,805
Cost of Operations			
COGS	6,168,171,648	16,170,429,570	25,514,846,978
Utilities	2,313,064,368	6,063,911,089	9,568,067,617
Labor	3,084,085,824	8,085,214,785	12,757,423,489
QC & testing	2,313,064,368	6,063,911,089	9,568,067,617
SG&A	1,542,042,912	4,042,607,393	6,378,711,744
Total OPEX	15,420,429,120	40,426,073,926	63,787,117,444
EBITDA	3,855,107,280	10,106,518,481	15,946,779,361
<i>EBITDA Margin</i>	<i>20%</i>	<i>20%</i>	<i>20%</i>
NOPAT	2,288,867,669	6,778,788,095	10,981,433,312
Financing			
Interest	4,402,186,523	3,223,331,766	706,782,910
Debt Outstanding	33,258,632,517	22,648,939,697-	0.00

Revenue calculation based on:

- Manufacturing capacity of 100 Mn doses/year
- Initial average price per dose of PKR 420²
- Annual PKR price increase of 7%

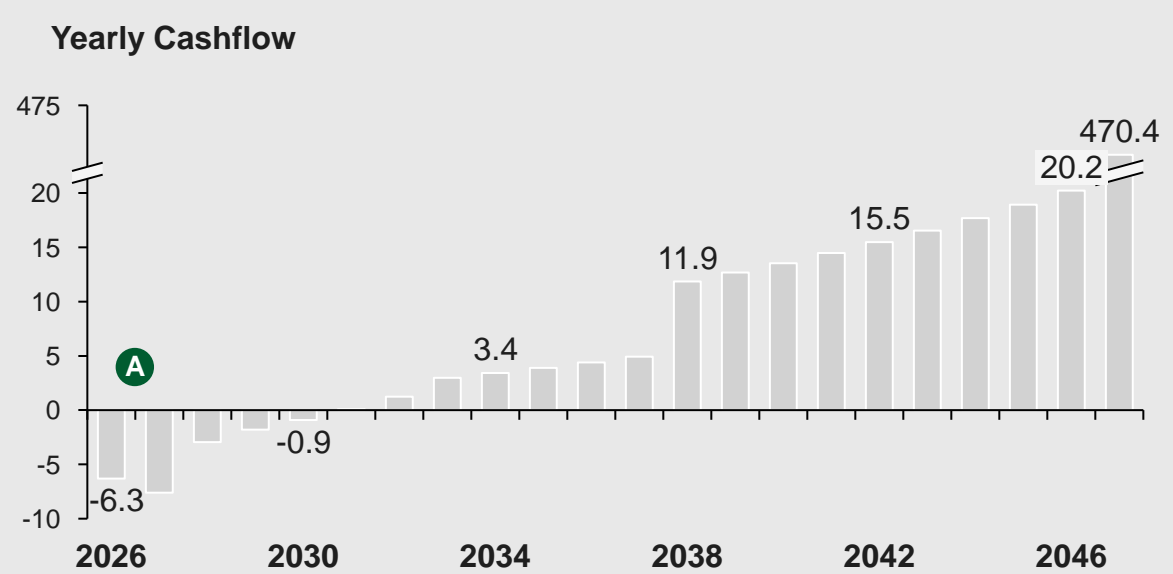
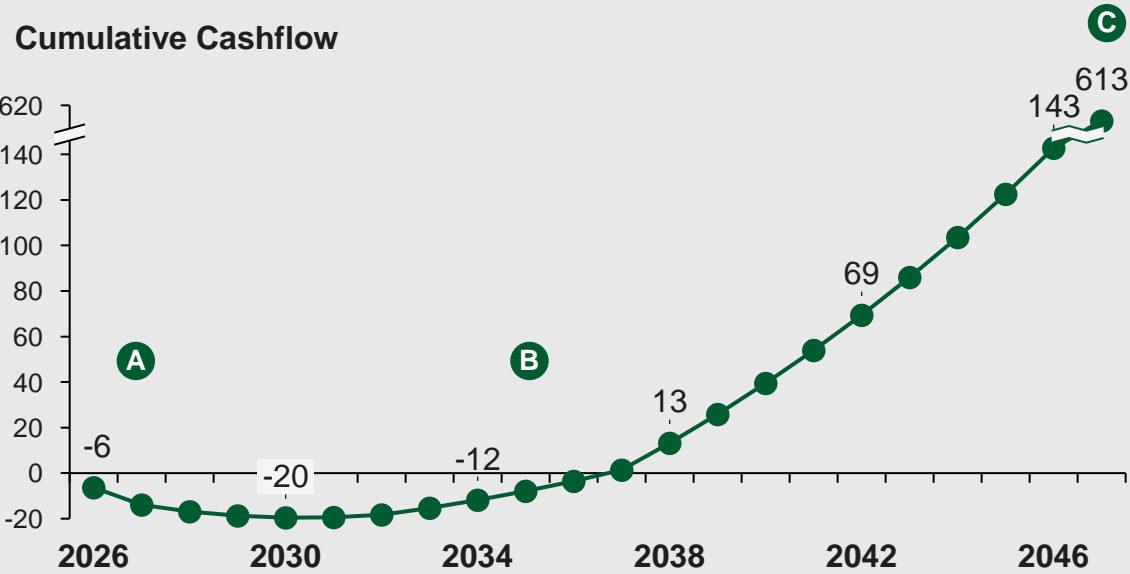
- Raw material (formulations) as the main cost driver (~40% of the cost base)
- Operations reflecting additional maintenance and cleaning / sterilization costs related to the production of live and non-live vaccines
- Expert input / industry reports
- Other desktop research and benchmarking

- Project coverage, loan duration and interest rate provided by local bank
- Debt in Year 1 includes additional interest accrued by not paid during development

17 1. Operating years, after 2-year development period (i.e., contract years 3, 7, 12); 2. Considers an average in line with the mix of imported vaccines in Pakistan, covering lower cost vaccines (e.g., BCG and Diphtheria, below 80 PKR/dose) and higher cost vaccines (e.g., PCV-13 and IPV, costing >600 PKR/dose)

D. Investor Cash Flows

Investor cash flows, PKR Bn



Investor cash flows:

- Upfront equity investment:
 - PKR 12.6Bn over 2 years of development
 - PKR 1.3Bn in working capital to fund initial operating period
- Cumulative cash flows over the duration of the investment: PKR 610 Bn (including terminal value)

Additional information:

- A** Development period: 2 years; debt drawdown as per construction phasing
- B** Payback period: year 10 of operations
- C** Terminal value: PKR 440 Bn; computed as 2.8x¹ Revenue multiple (as per NYU Damodaran industry benchmarks in emerging markets)

D. P&L Assumptions



Extract from financial model

Preliminary numbers being validated; figures provided are estimations based on available information

Revenue Assumptions		
Assumption	Unit	Value
Price	PKR / Dose	420
	PKR / Vial ¹	4,200
Manufacturing Plant Capacity	Doses / year	100,000,000
	Vials ¹ / year	10,000,000
Initial Utilization	%	40%
Incremental Utilization	%	10%
Final Utilization	%	90%
Inflation (PKR)	%	7%

OPEX Assumptions		
Assumption	Unit	Value
COGS	% of Total OPEX	40%
Utilities	% of Total OPEX	15%
Labor	% of Total OPEX	20%
QC & testing	% of Total OPEX	15%
SG&A	% of Total OPEX	10%
EBITDA Margin	%	20%

D. CAPEX assumptions

Extract from financial model

Preliminary numbers being validated; figures provided are estimations based on available information

Total Project Cost			
Assumption		Unit	Value
	Total CAPEX	PKR	42,000,000,000
Total CAPEX Breakdown	Land Acquisition	%	5%
	Construction	%	15%
	Filling and Packaging Lines	%	40%
	Clean Room	%	15%
	Utilities	%	15%
	QC area	%	10%

Thank You



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