

Roadmap to Future Vaccines

Market, Manufacturing, and Supply Chains

Prashant Yadav

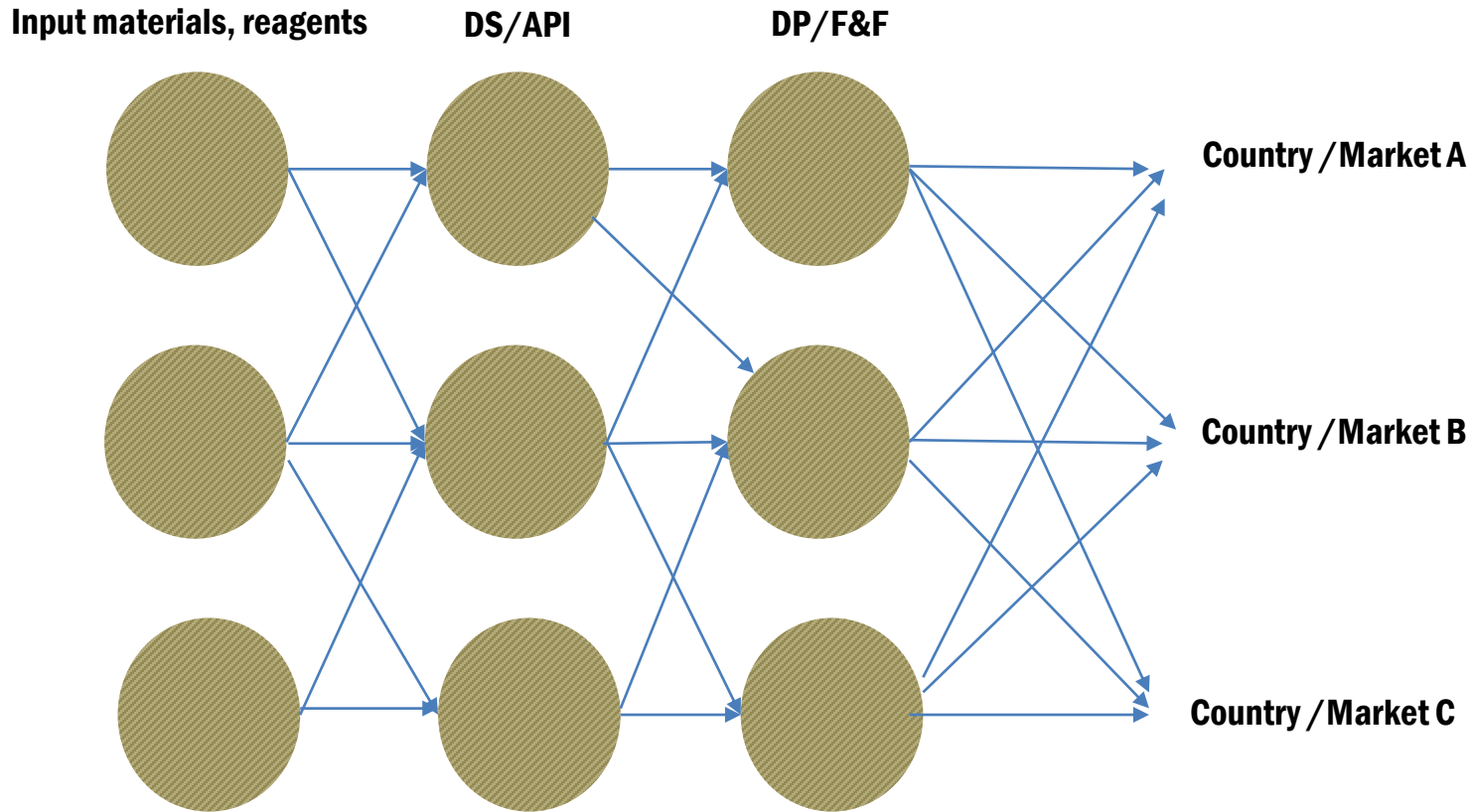


DCVMN Annual Meet
October 20-22, 2022

Three key points for your attention

- 1** Reimagining the shape of the global vaccine production network- WHY, WHAT, HOW?
- 2** Challenges for DCVMN members to prioritize product mix/portfolio of vaccine candidates
- 3** Smarter ways to investing at risk

Rethinking the “shape” of the global vaccine production network



Maximum flow?

Equity of flow for each market?

Robustness to node(s) put under export control?

Lowest cost per Unit dose of output?

Network time to start?

Broader/longer protection vaccines (e.g., COVID, influenza), operational challenges, and global system for manufacturing and distribution

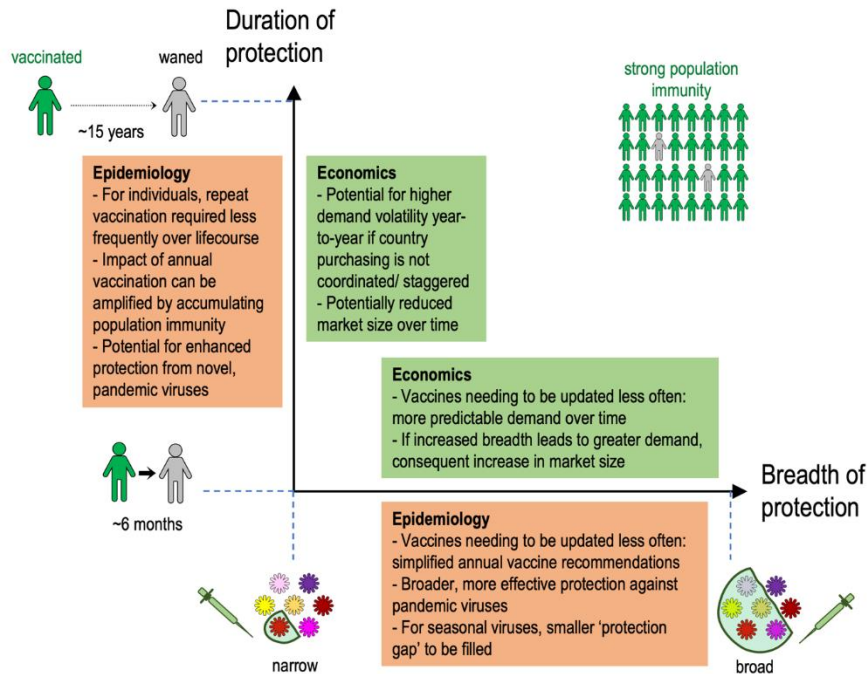


Figure: schematic illustration of economic and epidemiological considerations for future influenza vaccines, associated with their breadth and duration of protection. Coloured boxes show key factors (discussed further in the text) associated with increasing vaccine performance along the associated axis.



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POLICY FORUM

GLOBAL HEALTH

A global system for the next generation of vaccines

COVID-19 has shown that hurdles can be overcome

By Nimalan Arinaminpathy^{1,2},
Chadi M. Saad-Roy³, Qiqi Yang⁴, Isa Ahmad^{1,2},
Prashant Yadav^{5,6}, Bryan Grenfell^{1,7}

years. New vaccines would transform these production methods. For example, both mRNA and viral vector technology bypass

Arinaminpathy N, Saad-Roy CM, Yang Q, Ahmad I, Yadav P, Grenfell B.

A global system for the next generation of vaccines. *Science*. 2022 Apr 29;376(6592):462-464.

DCVMN members and Vx program prioritization

Competing criterion and high uncertainty

- Premature Deaths Averted per Year
- DALYs Averted
- Cases Prevented per Year
- Eradication/ Elimination Targets

- Societal Value
- Cost-Effectiveness

- Likelihood of Success
- Experience with Production Platform
- Existing asset base for Production Platform

- Interest by global agencies and philanthropies
- Interest by domestic government

Flexibility in Manufacturing Assets



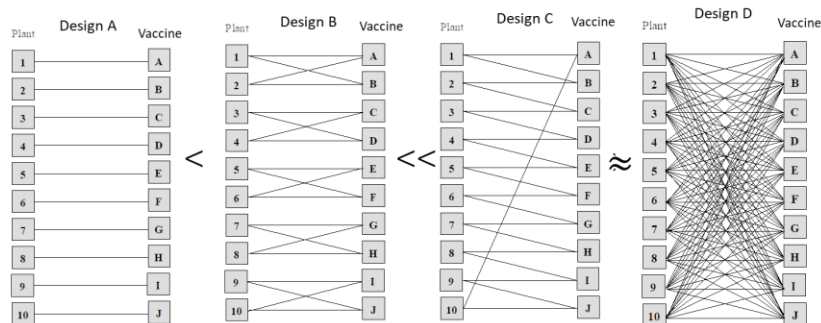
Operations

Boosting Vaccine Production Needs the Right Degree of Flexibility



Prashant Yadav and Antoine Desir, INSEAD

| 03 Nov 2021

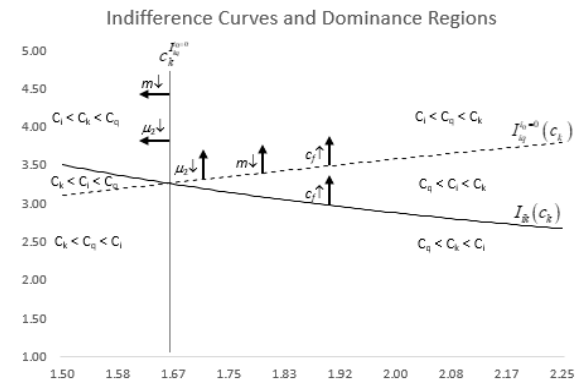
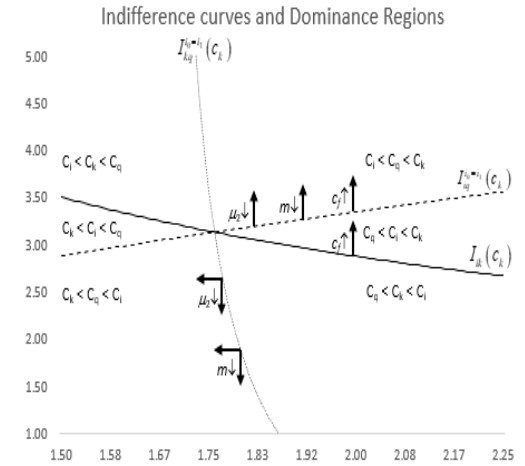


Source = Desir and Yadav 2021

Smarter application of investment at risk?

Rapid investments in manufacturing capacity require government and institutional funding. What form?

- 1 Capital grant, concessional loan or equity
- 2 Working capital facility, seconded staff, other mechanisms for overhead reduction
- 3 Purchasers agree to pay a time limited premium
- 4 Advanced purchase agreement, volume guarantee



Comparison of different instruments assuming static production cost-curves (some analysis in Kazaz, Webster, Yadav 2020)

Learning curve effects and dynamic production cost curves ?

Three key points for your attention

- 1** Reimagining the shape of the global vaccine production network- The WHY & WHAT are clear, the HOW needs some more thinking
- 2** Prioritizing product mix/portfolio of future vaccine candidates is a significant challenge for DCVMN members
- 3** We can develop smarter ways to investing-at-risk (by government and institutional)