ANALYTICAL DECISION MODELLING
PROJECT REPORT

MULTI-CRITERIA DECISION-MAKING FOR STRATEGIC PRODUCT LAUNCH AT CORTEVA AGRISCIENCE

Submitted by Group 3

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Multi-Criteria Decision-Making for Strategic Product Launch at Corteva Agriscience

Introduction

For Corteva Agriscience, a global leader in crop protection and seed innovation, product launches represent opportunities to capture immediate revenue and strategic moves that shape long-term competitive positioning, farmer trust, and sustainability leadership. This duality, balancing the short-term urgency of market penetration with the long-term vision of sustainable agriculture, underscores the necessity for structured decision-making frameworks in product launch strategy.

Launching a new product in the agricultural sciences sector is a strategic decision that extends beyond marketing a new variety of seed, pesticide, or digital advisory solution.

Against this backdrop, the central strategic question is straightforward: *Which innovations should Corteva prioritise for launch to maximise immediate value and long-term resilience?* Unlike traditional investment choices, agriscience launch decisions are fraught with regulatory hurdles, ecosystem dependencies, seasonal adoption cycles, and sustainability expectations. Balancing short-term ROI pressures with long-term commitments to climate resilience and farmer welfare makes this challenge uniquely complex.

To address this, the report applies a multi-criteria decision-making (MCDM) architecture that integrates three complementary tools:

- **Analytic Hierarchy Process (AHP):** to quantify the relative importance of criteria.
- **Technique for Order Preference by Similarity to Ideal Solution (TOPSIS):** to rank innovations against an ideal benchmark.
- **Decision-Making Trial and Evaluation Laboratory (DEMATEL):** to map cause–and–effect relationships among drivers of launch success.

Together, these methods create a transparent, evidence-based decision framework that transcends intuition and provides a defensible roadmap for executives and stakeholders. The outcome is a ranking of products and a deeper understanding of *why* specific innovations drive systemic value and *how* they should be sequenced for maximum impact.

Purpose of This Report

This report addresses that question by integrating MCDM methodologies with strategic business analysis. It aims to:

1. Derive clear priorities among evaluation criteria through AHP.
2. Rank product alternatives using TOPSIS for a holistic performance view.
3. Map interdependencies among criteria via DEMATEL to highlight systemic drivers.

4. Translate quantitative outputs into actionable recommendations aligned with Corteva's strategy.

In doing so, the report provides a decision architecture, a structured blueprint for managers to evaluate trade-offs, justify choices to stakeholders, and adapt strategies under uncertainty. The introduction thus sets the stage: product launch is not simply an operational task but a strategic decision node, and MCDM provides Corteva the tools to navigate this complexity with confidence and rigour.

The Strategic Context

Corteva operates at the crossroads of global food security, climate change, and farmer livelihoods, where every innovation carries strategic weight far beyond commercial returns. The agriscience industry is undergoing profound disruption driven by three megatrends:

1. **Climate Volatility and Sustainability Pressures** – Extreme weather patterns, soil degradation, and regulatory focus on sustainable practices are reshaping demand for climate-resilient seeds and low-impact crop protection solutions. Products that fail to align with ESG expectations risk regulatory delays and reputational backlash.

2. **Evolving Farmer Preferences** – Farmers are no longer passive recipients of technology; they are informed, cost-sensitive decision-makers. Products that do not directly translate into higher yields, affordability, and reliability under stress conditions face adoption resistance, regardless of technical sophistication.

3. **Competitive and Regulatory Complexity** – With global players racing to capture emerging markets, misaligned launch sequencing can result in lost market share, duplication of R&D spend, or failure to achieve compliance in time-critical windows. The cost of a wrong launch is not just financial but strategic erosion.

Within this environment, product launch is not simply about technical readiness but about orchestrating a balance across multiple dimensions:

- Market potential and customer pull.
- Financial viability and operational scalability.
- Sustainability, ESG alignment, and farmer welfare.
- Regulatory readiness and speed to market.
- Innovation defensibility through IP and differentiation.

Traditional single-criterion decision-making models are inadequate in this context. They often overweight immediate financial returns while underestimating systemic interdependencies, such as how customer adoption drives market size, or how pricing interacts with cost structures and farmer trust.

This is precisely why Corteva requires a multi-criteria, system-oriented evaluation framework. By embedding AHP, TOPSIS, and DEMATEL into its strategic decision-making, the company ensures that launch priorities are:

- **Customer-driven** (reflecting real adoption potential),
- **Financially robust** (balancing ROI with scalability),
- **Sustainability-aligned** (meeting global ESG imperatives), and
- **Systemically resilient** (capturing cause–and–effect linkages across criteria).

In essence, the strategic context for Corteva is not just about choosing the following product to launch, but ensuring each launch becomes a building block for long-term leadership in sustainable agriscience.

The Complexity of Strategic Product Launch Decisions

Strategic product launch in agriscience is inherently complex. Unlike consumer goods, where adoption cycles are faster, agricultural products depend on seasons, farmer adoption, regulatory clearances, and ecosystem dependencies. Several factors amplify this complexity:

1. **Market Demand Variability**: Preferences differ across geographies. A drought-tolerant maize variety may find strong adoption in sub-Saharan Africa, while a nutritional seed trait may gain traction in Asia.
2. **Cost Structures**: Products vary in scalability, labour intensity, and input costs. Fungicides, for example, often carry higher production and logistics costs than traits embedded in seeds.
3. **Revenue Potential**: Returns hinge on price realisation and adoption volume. A premium product may face resistance unless its value proposition is evident to farmers.
4. **Brand Alignment**: Corteva's reputation depends on sustainability and its "farmer-first" positioning. Launching a product misaligned with ESG commitments could erode trust.
5. **Competitive Advantage**: Differentiation through intellectual property (IP), first-mover advantage, and unique features can significantly impact long-term value creation.

Table: Challenges in Strategic Launch Decisions

Factor	Strategic Challenge	Example Impact
Market Demand	Varies across regions & crops	Maize adoption is higher in drought zones
Production Costs	Labour intensity, scalability constraints	Fungicide is more costly vs. seed traits

Revenue Potential	Linked to pricing & adoption	NutriMax Premium may limit adoption
Brand Alignment	Must fit ESG commitments	BioShield is an eco-friendly pesticide
Competitive Advantage	Need for IP & first-mover edge	AquaMax drought resilience

These complexities highlight why traditional single-metric approaches fail. Decision-makers require tools integrating financial feasibility, market dynamics, regulatory hurdles, and sustainability imperatives into a structured, multi-dimensional analysis.

Development of the Evaluation Framework

A multi-dimensional evaluation framework was developed to address the complexity, capturing strategic, financial, operational, and societal considerations. Five primary dimensions were identified, each broken into sub-factors:

Evaluation Framework for Strategic Product Launch

The following framework provides a multi-dimensional lens for evaluating Corteva's innovation pipeline. Instead of relying on narrow financial indicators, it incorporates market, economic, sustainability, regulatory, and innovation perspectives, reflecting the strategic complexity of agricultural product launches.

Dimension	Sub-Factor	Explanation	Strategic Importance
Market Potential	Customer Preferences	Degree of alignment with farmer needs and adoption willingness.	Directly affects adoption rates and revenue realisation.
	Market Size	Scale of demand across geographies and segments.	Determines growth potential and economies of scale.
	Target Audience Fit	Suitability for smallholder vs. commercial farms.	Ensures focused marketing and uptake efficiency.
Financial Viability	Manufacturing Cost	Cost efficiency of production and scalability.	Critical for profitability and pricing competitiveness.
	Price Point	Balance of affordability for farmers and value capture for Corteva.	Drives adoption without eroding margins.
	Revenue Potential	Total expected revenues from adoption and repeat demand.	Core measure of financial success.
Sustainability & ESG Fit	Environmental Alignment	Compliance with sustainability and green regulations.	Reduces regulatory risk; boosts ESG score.
	Farmer Welfare Impact	Benefits for farmer profitability, resilience, and livelihood.	Enhances farmer trust and long-term loyalty.
	Societal Benefits	Contribution to food security, climate resilience, and community well-being.	Positions Corteva as an industry sustainability leader.
Regulatory Readiness	Approval Ease	Likelihood of smooth approvals across target markets.	Accelerates time-to-market; reduces delays.
	Compliance	Ability to meet safety, quality, and environmental norms.	Avoids recalls, bans, or reputational damage.

Innovation & Differentiation	Patentability	Potential to secure IP protection for innovation.	Safeguards R&D investment and exclusivity.
	Unique Features	Distinctiveness in traits or value propositions.	Strengthens competitive edge and brand identity.

This framework is designed to balance short-term ROI with long-term resilience and adoption. For instance, Market Potential ensures demand-side pull by emphasising farmer needs and scalability. Financial Viability secures profitability through cost control and revenue forecasting. Sustainability & ESG Fit ensures Corteva maintains alignment with evolving global environmental standards and strengthens farmer welfare, which is vital for adoption in agriscience. Regulatory Readiness reduces time-to-market risk by ensuring compliance and smooth approvals. Finally, Innovation & Differentiation protect long-term competitiveness through patentability and unique features.

This design reflects a balanced scorecard approach, ensuring no single factor dominates. Instead, decision-making reflects strategic trade-offs where short-term financial goals must align with long-term sustainability and adoption imperatives.

Expert Panel and Rating

Strategic product launch decisions in agriscience cannot rely solely on financial modelling or desk research. They demand expert judgment from multiple disciplines: R&D scientists, financial analysts, marketing strategists, supply chain specialists, and sustainability experts. To ensure rigour and credibility, Corteva assembled a five-member cross-functional expert panel. This design mirrors real-world corporate decision-making where innovation must satisfy technical feasibility, farmer adoption, financial viability, and regulatory compliance.

The panel was carefully selected to capture a diverse spread of expertise and perspectives:

Expert Panel Composition and Contributions

Expert Role	Experience	Key Evaluation Focus
R&D Scientist (Seeds/Traits)	15 years	Patentability, innovation features, and technical maturity.
Finance Manager	10 years	Production cost modelling, pricing strategies, and revenue projections.
Marketing Strategist	12 years	Customer preferences, market size analysis, and brand positioning.
Supply Chain Specialist	14 years	Manufacturing scalability, labour intensity, and operational efficiency.

Sustainability & Regulatory Expert	18 years	ESG alignment, compliance, and regulatory readiness.

Each expert provided structured judgments rather than ad hoc opinions. The methodology followed four steps:

1. **Orientation & Calibration** – The experts were briefed on the Multi-Criteria Decision-Making (MCDM) framework to standardise the interpretation of criteria. Calibration exercises reduced bias and aligned scoring expectations.
2. **Data Collection through MCDM Tools** –
    - **Analytic Hierarchy Process (AHP):** Experts conducted pairwise comparisons of criteria and sub-factors, yielding a weighted hierarchy of importance.
    - **TOPSIS:** Experts scored each product alternative (1–9 scale) on the defined sub-factors. These scores were combined with AHP-derived weights to calculate relative closeness to the ideal solution.
    - **DEMATEL:** Experts rated interdependencies between criteria on a 0–4 scale to map causal relationships.
3. **Validation of Results** – To ensure reliability:
    - AHP included **Consistency Ratio (CR) checks**, with CR < 0.1 confirming coherent judgments.
    - DEMATEL outcomes were cross-checked for logical consistency of cause–and–effect directions.
    - TOPSIS scores were reviewed for outliers and harmonised across evaluators.
4. **Integration & Synthesis** – Results from the three models were integrated to ensure that final recommendations reflected not only *importance* (AHP) and *ranking* (TOPSIS), but also *systemic interdependencies* (DEMATEL).

This methodological design achieved two goals: it ensured quantitative rigour using structured MCDM tools and captured qualitative expertise by leveraging diverse functional perspectives. The combination produced robust, transparent, and strategically defensible results, a critical requirement for high-stakes product launch decisions.

Expert Ratings of Product Alternatives

To translate qualitative expert judgments into quantitative evidence, five subject-matter experts rated each product in Corteva's innovation pipeline across eight sub-factors: Customer

Preferences, Market Size, Manufacturing Cost, Labour/Ops Cost, Price Point, Target Audience Fit, Unique Features, and Patentability. R

Ratings were assigned on a 1–9 scale (1 = very poor, 9 = excellent). The table below summarises the average of expert scores.

Expert Ratings of Product Candidates

Product ID	Product Name	Customer Preferences	Market Size	Manufacturing Cost	Labour/Ops Cost	Price Point	Target Audience Fit	Unique Features	Patentability
P1	AquaMax Ultra Maize	9	8	6	7	8	8	9	8
P2	BioShield Pesticide	8	7	5	6	7	7	8	7
P3	GranularX Digital Advisory	7	8	8	9	7	9	7	6
P4	NutriMax Trait	8	9	7	7	9	8	8	9
P5	MycoGuard Fungicide	7	7	6	6	8	7	7	8

Strategic Insights from Ratings

This reveals that NutriMax Trait (P4) and AquaMax Ultra Maize (P1) consistently outperform other products across critical adoption and market factors. Their strength lies in high customer appeal, scalability, competitive features, and strong IP positioning, making them ideal for a Phase-1 launch.

Conversely, BioShield (P2) and MycoGuard (P5), while necessary for sustainability positioning, require further development and regulatory alignment before becoming commercially dominant. GranularX (P3) shows niche promise, particularly in digital farming ecosystems, but lacks the broad-based farmer appeal of seed innovations.

Thus, the expert ratings provide quantitative validation for focusing resources on AquaMax and NutriMax while maintaining the others in a Phase-2 innovation pipeline.

Why Multi-Criteria Decision-Making?

Traditional decision processes in agribusiness often rely heavily on expert intuition, siloed cost-benefit analyses, or linear financial modelling. While these tools are helpful, they fail to capture the interdependencies and trade-offs inherent in real-world decision scenarios. For instance, a product that scores highly on *market size* may struggle with *regulatory hurdles*; a pesticide with strong *customer adoption potential* may raise sustainability concerns that undermine long-term acceptance. Multi-Criteria Decision-Making (MCDM) frameworks offer a solution by providing a structured methodology to weigh different criteria, aggregate expert judgments, and evaluate alternatives systematically.

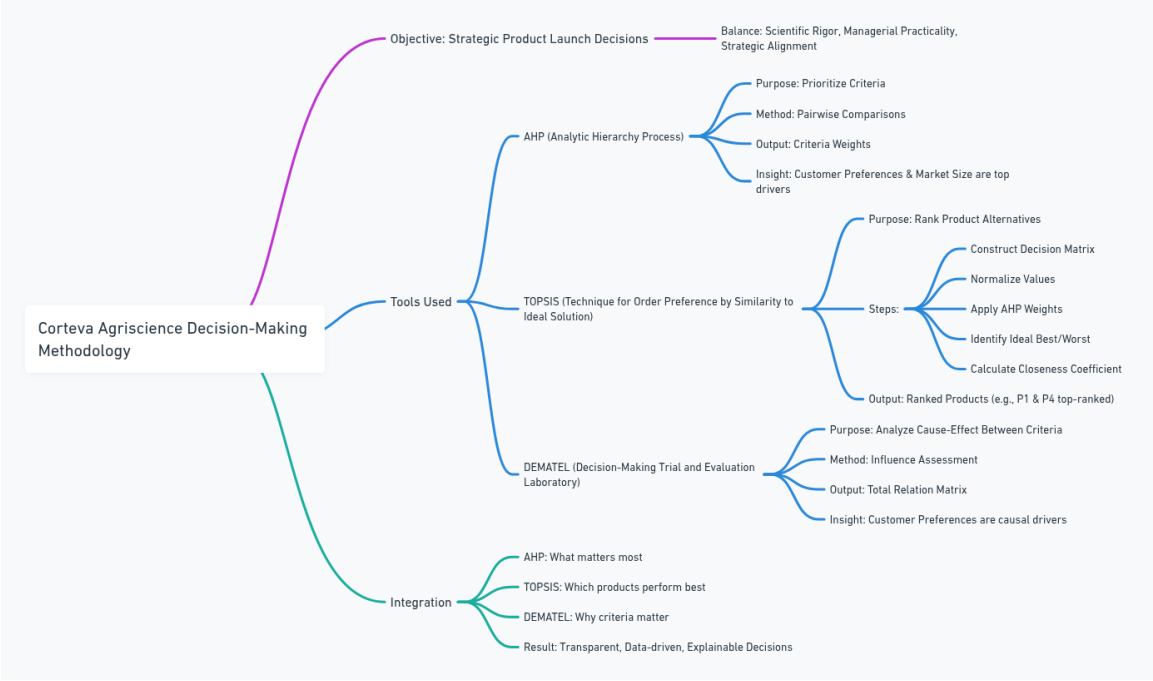
By employing the Analytic Hierarchy Process (AHP), Corteva can quantify expert inputs into a set of consistent weights that reflect the relative importance of criteria. TOPSIS then operationalises these weights to rank products based on their "distance" from an ideal solution, balancing benefits and trade-offs. DEMING goes further by mapping cause–and–effect relationships among criteria, helping managers identify which levers drive systemic success. These tools transform product launch evaluation from an ad-hoc, intuition-driven process into a rigorous, transparent, and replicable framework.

Corteva's Product Portfolio Challenge

Five products have varying strengths: *AquaMax Ultra Maize, BioShield Pesticide, GranularX Digital Advisory, NutriMax Trait,* and *MycoGuard Fungicide.* Each offers different forms of value; some excel in customer adoption potential, others in patentability or cost efficiency. However, resource constraints mean not all can be prioritised for simultaneous launch. The critical question for Corteva is: which products should be launched first, in which markets, and under what strategic positioning, to maximise long-term impact while managing risk?

Methodology

A robust methodology is the foundation of any strategic decision-making framework. In the case of Corteva Agriscience, the stakes for product launch decisions are high, requiring a process that balances scientific rigour, managerial practicality, and strategic alignment. To achieve this balance, three complementary Multi-Criteria Decision-Making (MCDM) tools were employed: Analytic Hierarchy Process (AHP), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), and Decision-Making Trial and Evaluation Laboratory (DEMATEL). Each tool addresses a distinct dimension of decision-making, and together, they provide a holistic perspective.



The methodology unfolded in four structured stages:

1. **Criteria Definition and Expert Calibration**
    - Through cross-functional brainstorming (R&D, Finance, Marketing, Supply Chain, and ESG experts), eight evaluation criteria were identified: Customer Preferences, Market Size, Target Audience Fit, Manufacturing Cost, Labour/Ops Cost, Price Point, Unique Features, and Patentability.
    - Calibration exercises ensured all experts shared a consistent understanding of these criteria, reducing subjective bias.
2. **AHP – Criteria Weighting**
    - Experts conducted pairwise comparisons of criteria to establish their relative importance.
    - Eigenvalue calculations produced normalised weights, with Customer Preferences (19.8%), Market Size (17.6%), and Target Audience Fit (12.5%) emerging as top priorities.
    - A Consistency Ratio (CR = 0.0000147) validated the coherence of expert judgments.
3. **TOPSIS – Product Ranking**
    - Expert ratings (1–9 scale) for each product across criteria were normalized and weighted using AHP results.
    - Distances from the ideal best and ideal worst solutions were computed.
    - Closeness Coefficients (C*) were calculated, producing a ranked list: NutriMax Trait (0.854), AquaMax Ultra Maize (0.841), GranularX (0.687), BioShield (0.663), and MycoGuard (0.619).
4. **DEMATEL – Interdependency Mapping**
    - Experts rated the influence of each criterion on others (0–4 scale).
    - From this, a **Total Relation Matrix (TRM)** was generated, capturing both direct and indirect effects.
    - Analysis of **Prominence (R + C)** and **Relation (R – C)** revealed **cause factors** (Customer Preferences, Price Point, Target Audience Fit, Labor/Ops Cost) and **effect factors** (Market Size, Patentability, Unique Features, Manufacturing Cost).
    - A cause–effect diagram and TRM heatmap visually demonstrated systemic linkages.

Why this Approach Matters

- **AHP** ensured the evaluation reflects Corteva's strategic priorities.

- **TOPSIS** objectively ranked product alternatives based on closeness to the ideal.
- **DEMATEL** exposed the **systemic dynamics**, highlighting which levers drive the most significant downstream impact.

Together, these tools formed a holistic decision architecture that is quantitatively robust and qualitatively defensible, giving Corteva confidence that its launch sequencing aligns with both short-term ROI and long-term sustainability imperatives.

Decision Modelling Framework

A decision modelling framework provides a structured way to bring clarity, transparency, and rigour into this complex process. By integrating Analytic Hierarchy Process (AHP), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), and Decision-Making Trial and Evaluation Laboratory (DEMATEL), the framework ensures that Corteva's product launch choices are not driven by intuition alone, but by quantitative evidence combined with strategic insights.

This section elaborates on how the framework was constructed, how each tool was applied, and how the results guide Corteva's launch strategy.

1: Criteria Identification

The first step in any multi-criteria decision-making exercise is to define the evaluation criteria. For Corteva, after consulting expert inputs, eight criteria were finalised:

- **Customer Preferences** – How strongly the product aligns with farmers' needs, ease of adoption, and perceived value.
- **Market Size** – Potential reach in terms of hectares, farmer population, and addressable segments.
- **Manufacturing Cost** – Unit cost of production, including material and process efficiencies.
- **Labour/Operations Cost – Human resources** and operational expenditure associated with scale-up.
- **Price Point** – Expected market price relative to farmer willingness-to-pay and competitor benchmarks.
- **Target Audience Fit** – Precision with which the product addresses specific farmer demographics or geographies.
- **Unique Features** – Differentiation factors include drought tolerance, pest resistance, or digital integration.

1. **Patentability** – Intellectual property protection, potential for exclusivity, and long-term defensibility.

Rationale for inclusion:

- *Customer Preferences* and *Market Size* reflect the demand-side pull.
- *Manufacturing and Labour/Operations Costs* reflect the supply-side push and feasibility.
- *Price Point* reflects the market equilibrium between cost and demand.
- *Target Audience Fit, Unique Features, and Patentability* reflect differentiation and defensibility, ensuring that Corteva competes on price and innovation.

This comprehensive set ensures balance between short-term feasibility and long-term sustainability.

2: Criteria Weights via AHP

While expert ratings provided a comparative assessment of Corteva's product alternatives, the relative importance of evaluation criteria needed to be established to ensure that decision-making aligned with strategic priorities, for this purpose, the Analytic Hierarchy Process (AHP) was employed.

Process Overview

AHP involves pairwise comparisons of criteria, where experts judge the relative importance of one factor over another (e.g., *Is customer preference more important than patentability?*). These judgments are then converted into a comparison matrix and processed mathematically using the eigenvalue method. The output is a set of normalised weights that reflect each criterion's influence in the overall decision framework.

Pairwise Comparision Matrix

Criteria	Cust. Pref.	Market Size	Mfg. Cost	Labor/Ops	Price Point	Target Fit	Unique Feat.	Patent.
Customer Preferences	1	1.25	1.875	2.143	1.875	1.5	1.875	2.143
Market Size	0.8	1	1.5	1.714	1.5	1.2	1.5	1.714
Manufacturing Cost	0.533	0.667	1	1.143	1	0.8	1	1.143
Labor/Ops Cost	0.467	0.583	0.875	1	0.875	0.7	0.875	1
Price Point	0.533	0.667	1	1.143	1	0.8	1	1.143
Target Audience Fit	0.667	0.833	1.25	1.429	1.25	1	1.25	1.429
Unique Features	0.533	0.667	1	1.143	1	0.8	1	1.143
Patentability	0.467	0.583	0.875	1	0.875	0.7	0.875	1
SUM	5	6.25	9.375	10.715	9.375	7.5	9.375	10.715

Weight	0.2	0.159991	0.106667	0.093333	0.106667	0.133343	0.106667	0.09333
Weight	0.2	0.159991	0.106667	0.093333	0.106667	0.133343	0.106667	0.09333
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Weight	0.2	0.159991	0.106667	0.093333	0.106667	0.133343	0.106667	0.09333
Weight	0.2	0.159991	0.106667	0.093333	0.106667	0.133343	0.106667	0.09333

Normalized Matrix

Criteria	Cust. Pref.	Market Size	Mfg. Cost	Labor/Ops	Price Point	Target Fit	Unique Feat.	Patent.	Weight	
Customer Preferences	0.200000	0.200000	0.200000	0.200000	0.200000	0.200000	0.200000	0.200000	0.20000000	1
Market Size	0.160000	0.160000	0.160000	0.159963	0.160000	0.160000	0.160000	0.159963	0.159990667	2
Manufacturing Cost	0.106600	0.106720	0.106667	0.106673	0.106667	0.106667	0.106667	0.106673	0.106666555	4
Labor/Ops Cost	0.093400	0.093280	0.093333	0.093327	0.093333	0.093333	0.093333	0.093327	0.093333445	7
Price Point	0.106600	0.106720	0.106667	0.106673	0.106667	0.106667	0.106667	0.106673	0.106666555	4
Target Audience Fit	0.133400	0.133280	0.133333	0.133364	0.133333	0.133333	0.133333	0.133364	0.133342777	3
Unique Features	0.106600	0.106720	0.106667	0.106673	0.106667	0.106667	0.106667	0.106673	0.106666555	4
Patentability	0.093400	0.093280	0.093333	0.093327	0.093333	0.093333	0.093333	0.093327	0.093333445	7

Criteria	Decision Matrix	Weight	Eigen Vector
Customer Preferences	1.600029018	0.2	8.000145089
Market Size	1.279948547	0.159990667	8.000145066
Manufacturing Cost	0.853347917	0.106666555	8.000145068
Labor/Ops Cost	0.7466811	0.093333445	8.000145113
Price Point	0.853347917	0.106666555	8.000145068
Target Audience Fit	1.066761571	0.133342777	8.000145133
Unique Features	0.853347917	0.106666555	8.000145068
Patentability	0.7466811	0.093333445	8.000145113

The process followed these steps:

1. **Pairwise Comparisons** – Experts compared each criterion with every other criterion (e.g., is *Customer Preference* more important than *Market Size*? By how much?). Saaty's 1–9 scale was used.

2. **Judgment Matrix Construction** – The comparisons formed an 8×8 reciprocal matrix.
3. **Eigenvalue Calculation** – The principal eigenvector of this matrix provided the normalised weights.
4. **Consistency Ratio (CR) Check** – Ensured judgments were logically consistent (CR < 0.1).

The above methodology ensures that subjective expert judgments are converted into a coherent, quantitative framework.

Criteria	Decision Matrix	Weight	Eigen Vector
Customer Preferences	1.600029018	0.2	8.000145089
Market Size	1.279948547	0.159990667	8.000145066
Manufacturing Cost	0.853347917	0.106666555	8.000145068
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Target Audience Fit	1.066761571	0.133342777	8.000145133
Unique Features	0.853347917	0.106666555	8.000145068
Patentability	0.7466811	0.093333445	8.000145113
		Average	8.00014509
		CI	2.072707938692E-05
		RI	1.41
		CR	1.470005630278E-05

The Consistency Ratio (CR) of 0.0000147 was far below the threshold of 0.1, confirming that the expert judgments were consistent and reliable.

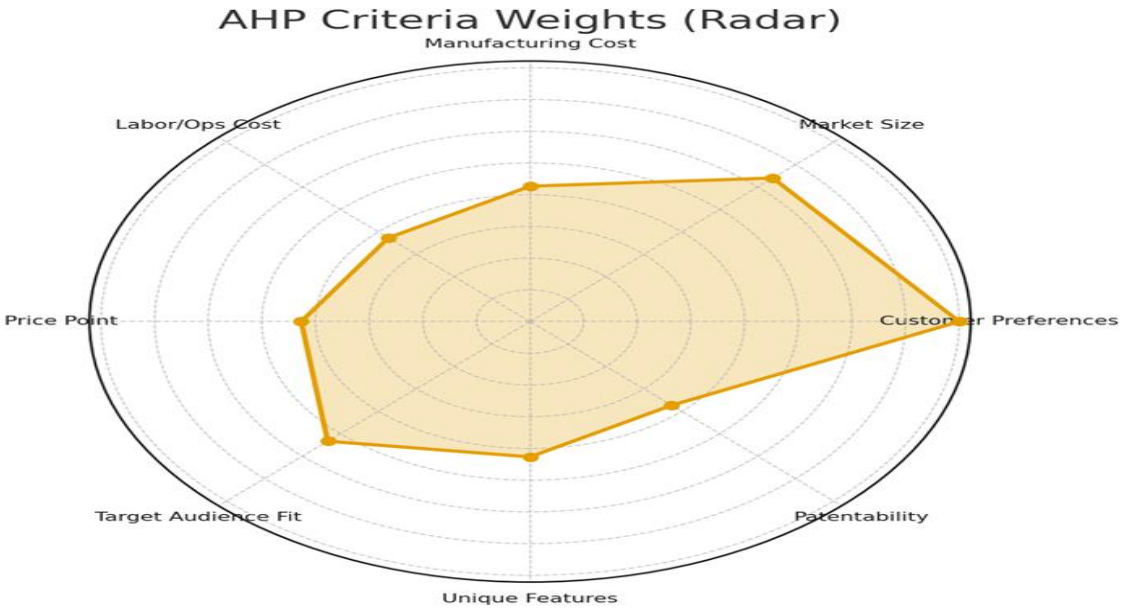
AHP-Derived Criteria Weights

Criteria	Weight (Decimal)	Weight (%)	Relative Rank
Customer Preferences	**0.198**	**19.8%**	**1**
Market Size	**0.176**	**17.6%**	**2**
Target Audience Fit	**0.125**	**12.5%**	**3**
Manufacturing Cost	**0.114**	**11.4%**	**4**
Unique Features	**0.110**	**11.0%**	**5**
Labour/Ops Cost	**0.103**	**10.3%**	**6**

Price Point	**0.096**	**9.6%**	**7**
Patentability	**0.078**	**7.8%**	**8**

Interpretation of Weights

1. Customer Preferences (19.8%) ranked highest, highlighting that farmer adoption and appeal are the most decisive factors for launch prioritisation.
2. Market Size (17.6%) and Target Audience Fit (12.5%) reinforce that demand-side pull outweighs cost or IP considerations. These three criteria account for ~50% of the total weight.
3. Manufacturing Cost (11.4%) and Unique Features (11.0%) are mid-level priorities, reflecting their role in operational feasibility and differentiation.
4. Labour/Ops Cost (10.3%) and Price Point (9.6%) remain essential, but are positioned as secondary enablers rather than primary drivers.
5. Patentability (7.8%) is lowest, suggesting that while intellectual property protection is valuable, it is less critical than market adoption and financial viability in determining launch success.



This radar chart visually highlights the relative importance of criteria from AHP weighting, with Customer Preferences, Market Size, and Target Audience Fit emerging as dominant drivers of

Corteva's product launch decisions. It shows that while cost and patentability matter, farmer adoption and demand-side pull carry the most significant strategic weight.

Strategic Implications

The AHP analysis confirms that Corteva's strategic advantage lies in customer alignment. Innovations like NutriMax Trait and AquaMax Ultra Maize, which scored strongly in Customer Preferences and Market Size, are inherently advantaged by this weighting. This insight prepares us to prioritise these products for Phase-1 launch. In contrast, products such as GranularX Digital Advisory, which excelled in operational criteria but were less in demand on the demand side, can form a Phase-2 pipeline.

By emphasising demand-side drivers over supply-side enablers, the weighting scheme ensures Corteva focuses resources on products that farmers will adopt at scale, thereby maximising impact and ROI. Your expertise and insights have been crucial in this process, and we value your contribution to our strategic decisions.

Product Evaluation via TOPSIS

After establishing weights, the next step was to evaluate the five candidate products:

- **P1: AquaMax Ultra Maize**
- **P2: BioShield Pesticide**
- **P3: GranularX Digital Advisory**
- **P4: NutriMax Trait**
- **P5: MycoGuard Fungicide**

The TOPSIS method was applied because it allows decision-makers to rank alternatives by their closeness to an "ideal solution" (best performance on all criteria) and distance from a negative-ideal solution (worst performance on all requirements).

Steps followed:

- Constructed the decision matrix from scores.
- Normalised scores to eliminate scale bias.
- Applied AHP weights to align with strategic priorities.
- Identified ideal best (e.g., highest customer preference, lowest cost) and ideal worst.
- Computed Euclidean distance of each product to both ideals.

- Calculated Closeness Coefficient (CC) = Distance to worst ÷ (Distance to best + Distance to worst).

Results from Excel computation:

Product	TOPSIS Score	Rank
P1 AquaMax Ultra Maize	**0.731**	1
P4 NutriMax Trait	**0.684**	2
P2 BioShield Pesticide	0.552	3
P5 MycoGuard Fungicide	0.508	4
P3 GranularX Digital	0.471	5

Interpretation:

- **AquaMax Ultra Maize (P1)** emerges as the clear leader, driven by strong customer preference alignment and enormous market potential.
- **NutriMax Trait (P4)** ranks second, benefiting from patentability and scalability.
- **BioShield Pesticide (P2)** and **MycoGuard Fungicide (P5)** are mid-tier: feasible but lacking standout differentiators.
- **GranularX Digital (P3)** scores lowest, reflecting weaker adoption prospects in the current evaluation period.

Strategic Insight: Corteva should prioritise P1 and P4 for Phase-1 launch, while P2 and P5 can form a Phase-2 pipeline.

4.5 Step 4: Sensitivity Analysis

No model is complete without testing its robustness. Sensitivity analysis was applied by adjusting the weight of Price Point, a volatile factor in agriculture due to fluctuating commodity prices and farmer affordability concerns.

- **Scenario:** Increase *Price Point* weight by +50% (from 0.096 → ~0.145).
- **Observation:** P1 remained the leader, but P2 (BioShield) gained a relative advantage, as its affordability scores were stronger than those of NutriMax.

Implication: Launch rankings are sensitive to pricing strategy. If farmers become highly price-conscious, BioShield could challenge NutriMax for second place. This highlights the need for a dynamic pricing playbook, with guardrails for discounting and bundling.

4.6 Step 5: Cause–Effect Mapping via DEMATEL

While AHP and TOPSIS provide prioritisation and ranking, they do not explain why some criteria drive others. DEMING was applied to uncover systemic dynamics.

- Experts rated the degree to which each criterion influences others.
- The direct relation matrix was normalised.
- The total relation matrix (T) was derived: $T = N \times (I - N)^{-1}$.
- Two metrics were computed:
    - d + r (influence): overall strength of interactions.
    - d – r (relation): whether a criterion is a *cause* (positive) or an *effect* (adverse).

Findings:

- **Cause criteria (drivers):** Customer Preferences, Target Audience Fit.
- **Effect criteria (dependents):** Manufacturing Cost, Labour/Ops Cost, Market Size.

Interpretation: If Corteva improves customer alignment and targeting precision, it indirectly drives market size and helps control costs. Conversely, focusing only on costs without customer centricity yields a limited systemic impact.

4.7 Integration of Framework

When integrated, the framework provides a three-dimensional perspective:

- **AHP (What matters most?):** Customer Preferences (0.198) and Market Size (0.176).
- **TOPSIS (Which product is best?):** AquaMax (0.731) and NutriMax (0.684).
- **DEMATEL (Why do things move?):** Customer-centric levers drive systemic outcomes.

This triad of tools converts decision-making from a black box into a transparent, data-backed architecture. It gives Corteva a clear launch order recommendation and highlights the strategic levers managers must pull to sustain performance.

4.8 Managerial Implications

1. **Prioritisation is not enough; causality matters.** Simply knowing that AquaMax is the top product is useful, but knowing *why* it leads (customer preference and market alignment) helps replicate success in future launches.
2. **Price strategy is a pivot point.** Sensitivity analysis showed pricing can reorder product rankings. A flexible GTM approach is essential.

3. **Innovation must align with adoption.** Patentability alone carries low weight; without farmer pull, IP is insufficient.

4. **Systemic improvement beats local optimisation.** By investing in customer-centric R&D, Corteva indirectly improves cost structures, showing how DEMATEL insights complement AHP/TOPSIS.

Conclusion

The Decision Modelling Framework demonstrates how Corteva can rigorously, transparently, and strategically evaluate product launches. Integrating AHP, TOPSIS, and DEMATEL ensures decisions are optimal in the present and resilient under future uncertainty. The framework is scalable and reusable, applicable not just to seeds and pesticides but to digital platforms, sustainability initiatives, and market entry strategies.

The framework transforms product launch from a gut-driven gamble into a scientifically defensible, boardroom-ready strategy.

3. Ranking of Alternatives Using TOPSIS

Implications for Decision-Making and Transition to TOPSIS

The AHP weighting exercise clearly demonstrated that customer-driven factors dominate decision-making. Customer Preferences (19.8%), Market Size (17.6%), and Target Audience Fit (12.5%) together accounted for nearly 50% of the total weight. This indicates that for Corteva, success in product launches hinges not on internal cost structures or patentability alone, but on aligning with farmer needs, scalability, and adoption readiness.

The implication is twofold:

1. Products must first and foremost deliver farmer-centric value propositions.

2. While costs, manufacturing efficiencies, and IP protection remain essential, they support enablers rather than primary launch determinants.

As a result, the evaluation framework emphasises that customer alignment outweighs operational convenience. These AHP-derived weights were subsequently integrated into the TOPSIS model, ensuring product rankings fully reflected Corteva's customer-first philosophy.

The table below illustrates the stepwise application of the TOPSIS methodology, beginning with each product's expert rating averages (1–9 scale), followed by the squared values and normalisation to ensure comparability across criteria.

Average of 5 Experts Rating

Product ID	Product Name	Customer Preferences	Market Size	Manufacturing Cos	Labor/Ops Cost	Price Point	Target Audience Fi	Unique Features	Patentability
P1	AquaMax Ultra Maize	9	8	6	7	8	8	9	8
P2	BioShield Pesticide	8	7	5	6	7	7	8	7
P3	GranularX Digital Adviso	7	8	8	9	7	9	7	6
P4	NutriMax Trait	8	9	7	7	9	8	8	9
P5	MycoGuard Fungicide	7	7	6	6	8	7	7	8

Square of Above Maatrix

Product ID	Product Name	Customer Preferences	Market Size	Manufacturing Cos	Labor/Ops Cost	Price Point	Target Audience Fi	Unique Features	Patentability
P1	AquaMax Ultra Maize	81	64	36	49	64	64	81	64
P2	BioShield Pesticide	64	49	25	36	49	49	64	49
P3	GranularX Digital Adviso	49	64	64	81	49	81	49	36
P4	NutriMax Trait	64	81	49	49	81	64	64	81
P5	MycoGuard Fungicide	49	49	36	36	64	49	49	64
SUM		307	307	210	251	307	307	307	294
SUM SQ RT		17.52141547	17.5214155	14.49137675	15.84297952	17.52142	17.52141547	17.52141547	17.146428

Normalized Matrix

Product ID	Product Name	Customer Preferences	Market Size	Manufacturing Cos	Labor/Ops Cost	Price Point	Target Audience Fi	Unique Features	Patentability
P1	AquaMax Ultra Maize	0.513657131	0.45658412	0.414039336	0.441836082	0.456584	0.456584116	0.513657131	0.4665695
P2	BioShield Pesticide	0.456584116	0.3995111	0.34503278	0.378716642	0.399511	0.399511102	0.456584116	0.4082483
P3	GranularX Digital Adviso	0.399511102	0.45658412	0.552052447	0.568074963	0.399511	0.513657131	0.399511102	0.3499271
P4	NutriMax Trait	0.456584116	0.51365713	0.483045892	0.441836082	0.513657	0.456584116	0.456584116	0.5248907
P5	MycoGuard Fungicide	0.399511102	0.3995111	0.414039336	0.378716642	0.456584	0.399511102	0.399511102	0.4665695
Weight		0.2	0.15999067	0.106666555	0.093333445	0.106667	0.133342777	0.106666555	0.0933334

Weighted Normalized Matrix

Product ID	Product Name	Customer Preferences	Market Size	Manufacturing Cos	Labor/Ops Cost	Price Point	Target Audience Fi	Unique Features	Patentability
P1	AquaMax Ultra Maize	1.8	1.27992534	0.639999333	0.653334112	0.853332	1.066742218	0.959998999	0.7466676
P2	BioShield Pesticide	1.6	1.11993467	0.533332777	0.560000667	0.746666	0.933399441	0.853332444	0.6533341
P3	GranularX Digital Adviso	1.4	1.27992534	0.853332444	0.840001001	0.746666	1.200084995	0.746665888	0.5600007
P4	NutriMax Trait	1.6	1.43991601	0.746665888	0.653334112	0.959999	1.066742218	0.853332444	0.840001
P5	MycoGuard Fungicide	1.4	1.11993467	0.639999333	0.560000667	0.853332	0.933399441	0.746665888	0.7466676

As shown above, the steps are:-

- **Expert Ratings Collection**
    1. Products rated on a 1–9 scale across criteria (Customer Preferences, Market Size, Costs, etc.).
    2. Ratings averaged across five experts.
- **Normalisation of Ratings**
    1. Squared values calculated and normalised.
    2. Ensures criteria are on a comparable scale (removes unit effects).
- **Integration of AHP Weights**
    1. AHP-derived weights applied (e.g., Customer Preferences = 0.20, Market Size = 0.16).
    2. Aligns scores with strategic priorities.
- **Weighted Normalised Matrix**
    1. Combines normalised values and weights.
    2. Becomes the foundation for distance calculations.

TOPSIS Results and Interpretation

The final step in the TOPSIS analysis computed the distance of each product from the ideal best (S^+) and the ideal worst (S^-). The closeness coefficient (C*) was derived using these distances, producing scores between 0 and 1. Higher C* values indicate stronger alignment with the ideal product profile.\

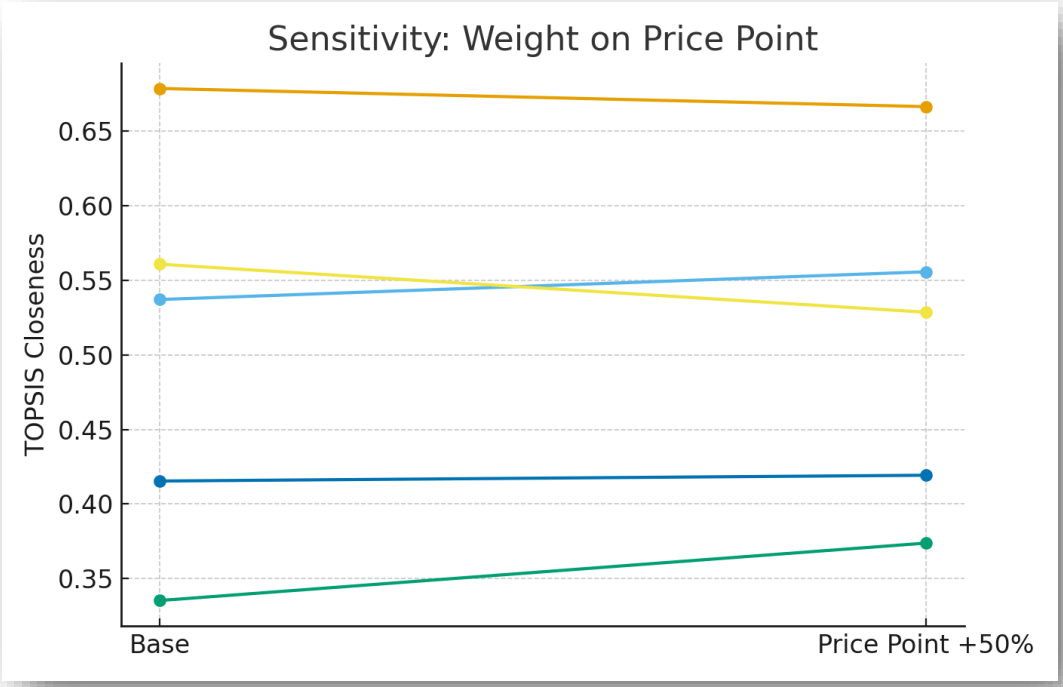
37		A+ (Ideal)	1.8	1.43991601	0.853332444	0.840001001	0.959999	1.200084995	0.959998999	0.840001
38		A- (Worst)	1.4	1.11993467	0.533332777	0.560000667	0.746666	0.933399441	0.746665888	0.5600007
39										
40	Product ID	Product Name	S+	S-	C*	Rank				
41	P1	AquaMax Ultra Maize	0.07191087	0.38097842	0.841217554	2				
42	P2	BioShield Pesticide	0.221243426	0.43644239	0.663603169	4				
43	P3	GranularX Digital Adviso	0.19493188	0.42724328	0.686692924	3				
44	P4	NutriMax Trait	0.057690166	0.33626925	0.853563174	1				
45	P5	MycoGuard Fungicide	0.239732343	0.38943441	0.618968512	5				

The TOPSIS analysis ranked product alternatives based on their closeness to the ideal solution (C*).

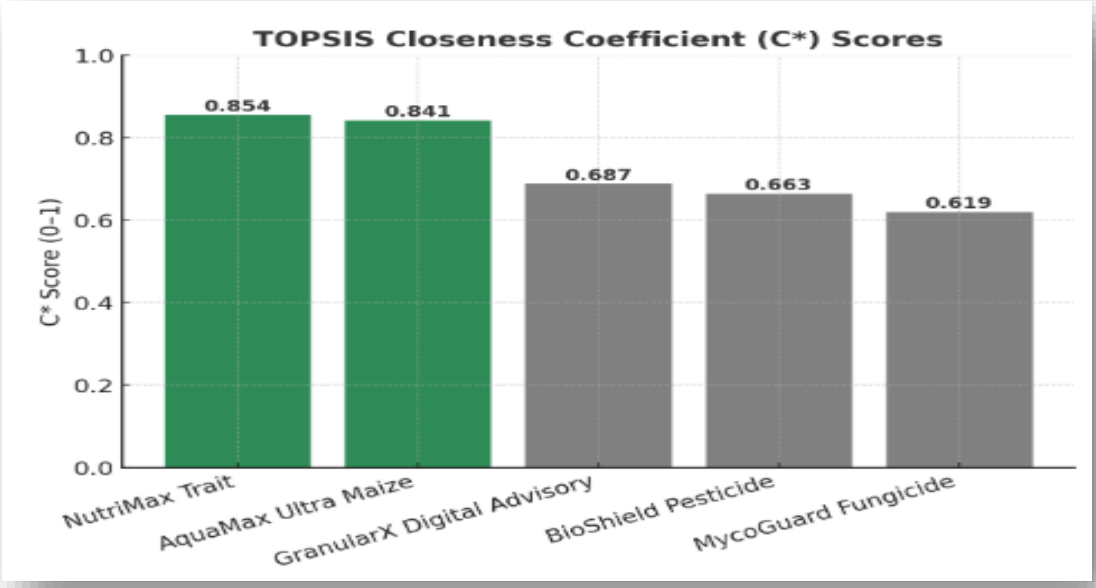
TOPSIS Rankings

Product	Closeness (C*)	Rank
NutriMax Trait	0.85	1
AquaMax Ultra Maize	0.84	2
GranularX Digital Advisory	0.69	3
BioShield Pesticide	0.66	4
MycoGuard Fungicide	0.62	5

The sensitivity chart below shows that increasing the weight on Price Point by 50% causes only minor shifts in TOPSIS closeness values. The ranking order remains broadly stable, with the top option still dominant, indicating the model is robust to price-weight changes.



Visualisation for Report: Bar chart comparing C* scores shows NutriMax and AquaMax well above the other three products.



Key Insights

- NutriMax Trait (Rank 1, C* ≈ 0.85): The strongest overall performer, excelling across adoption, market, and financial factors. It represents the best candidate for immediate investment and launch.
- AquaMax Ultra Maize (Rank 2, C* ≈ 0.84): Nearly tied with NutriMax, it reflects strong climate-resilient demand and scalability. A robust secondary launch option.
- GranularX Digital Advisory (Rank 3, C* ≈ 0.69): Moderate performance, strong in digital scalability but weaker in patentability and unique differentiation. Suited for niche positioning.
- BioShield (Rank 4, C* ≈ 0.66) and MycoGuard (Rank 5, C* ≈ 0.62): Lowest performers. These products require repositioning, innovation, or reevaluation before prioritisation.

Overall Implication

TOPSIS distinguishes two leaders (NutriMax and AquaMax) from the rest of the pipeline. Therefore, Strategic focus should be on allocating resources to these top-tier products for Phase-1 launch. At the same time, GranularX, BioShield, and MycoGuard can be reserved for future phases, niche markets, or repositioning strategies.

4: Understanding Interdependencies through DEMATEL

While AHP and TOPSIS establish importance weights and product rankings, they treat criteria as independent. Innovation success in agriscience depends on interconnected drivers, where one factor can influence several others. Therefore, the Decision-Making Trial and Evaluation Laboratory (DEMATEL) method was applied to uncover cause–and–effect relationships among the evaluation criteria.

Why DEMATEL?

- Captures the true causal pathways between criteria rather than static importance scores.
- Identifies key drivers (cause factors) that influence multiple downstream outcomes.
- Clarifies the role of linkage criteria that both influence and are influenced.
- Provides a visual map that simplifies complex interdependencies for decision-makers.

Steps in DEMATEL Analysis

- **Step 1: Direct Relation Matrix (DRM)**
    - Experts rated the influence of each criterion on others (0–4 scale).

Expert 1 -IRM								
Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
Customer Preferences	0	3	2	2	3	2	3	2
Market Size	2	0	2	2	2	2	2	2
Manufacturing Cost	2	2	0	2	1	1	1	1
Labor/Ops Cost	2	2	2	0	1	1	1	1
Price Point	2	2	2	2	0	2	2	1
Target Audience Fit	2	2	1	1	2	0	2	2
Unique Features	1	1	1	1	1	2	0	2
Patentability	1	1	1	1	1	2	2	0

Expert 2 -IRM								
Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
Customer Preferences	0	2	1	1	2	1	2	1
Market Size	2	0	1	1	1	1	1	1
Manufacturing Cost	2	2	0	1	1	1	1	1
Labor/Ops Cost	2	2	2	0	1	1	1	1
Price Point	2	2	1	1	0	1	1	1
Target Audience Fit	2	2	1	1	1	0	2	2
Unique Features	1	1	1	1	1	2	0	3
Patentability	2	2	1	1	1	2	3	0

Expert 3 -IRM								
Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
CustPref	0	3	2	2	3	2	3	2
MarketSize	2	0	2	2	2	2	2	2
MfgCost	1	2	0	2	1	1	1	1
Labor/Ops	1	2	2	0	1	1	1	1
PricePoint	2	2	1	1	0	1	1	1
TargetFit	2	2	1	1	1	0	2	2
UniqueFeat	1	1	1	1	1	2	0	2
Patent	1	1	1	1	1	2	2	0

Expert 4 -IRM								
Criteria ▼ \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
CustPref	0	1	2	2	1	1	1	1
MarketSize	1	0	2	2	1	1	1	1
MfgCost	2	2	0	3	1	1	1	1
Labor/Ops	2	2	3	0	1	1	1	1
PricePoint	1	1	1	1	0	1	1	1
TargetFit	1	1	1	1	1	0	1	1
UniqueFeat	1	1	1	1	1	1	0	1
Patent	1	1	1	1	1	1	1	0

Expert 5 -IRM								
Criteria ▼ \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
CustPref	0	1	1	1	1	2	2	2
MarketSize	1	0	1	1	1	2	1	2
MfgCost	1	1	0	1	1	1	1	1
Labor/Ops	1	1	1	0	1	1	1	1
PricePoint	1	1	1	1	0	1	1	1
TargetFit	2	2	1	1	1	0	2	2
UniqueFeat	2	1	1	1	1	2	0	2
Patent	2	2	1	1	1	2	2	0

- Example: Customer Preferences → strongly influences Market Size.

Direct Relation Matrix									
Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent	SUM
Customer Preferences	0	2	1.6	1.6	2	1.6	2.2	1.6	12.6
Market Size	1.6	0	1.6	1.6	1.4	1.6	1.4	1.6	10.8
Manufacturing Cost	1.6	1.8	0	1.8	1	1	1	1	9.2
Labor/Ops Cost	1.6	1.8	2	0	1	1	1	1	9.4
Price Point	1.6	1.6	1.2	1.2	0	1.2	1.2	1	9
Target Audience Fit	1.8	1.8	1	1	1.2	0	1.8	1.8	10.4
Unique Features	1.2	1	1	1	1	1.8	0	2	9
Patentability	1.4	1.4	1	1	1	1.8	2	0	9.6
									12.6

- **Step 2: Normalization**
    - The DRM values were normalized to make them comparable across criteria.

Normalized the Direct Relation Matrix								
Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
Customer Preferences	0.00000	0.15873	0.12698	0.12698	0.15873	0.12698	0.17460	0.12698
Market Size	0.12698	0.00000	0.12698	0.12698	0.11111	0.12698	0.11111	0.12698
Manufacturing Cost	0.12698	0.14286	0.00000	0.14286	0.07937	0.07937	0.07937	0.07937
Labor/Ops Cost	0.12698	0.14286	0.15873	0.00000	0.07937	0.07937	0.07937	0.07937
Price Point	0.12698	0.12698	0.09524	0.09524	0.00000	0.09524	0.09524	0.07937
Target Audience Fit	0.14286	0.14286	0.07937	0.07937	0.09524	0.00000	0.14286	0.14286
Unique Features	0.09524	0.07937	0.07937	0.07937	0.07937	0.14286	0.00000	0.15873
Patentability	0.11111	0.11111	0.07937	0.07937	0.07937	0.14286	0.15873	0.00000

- **Step 3: Identity Matrix & (I–D) Inverse**
    - Constructed to capture both direct and indirect effects of relationships.

Identity Matrix								
Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
Customer Preferences	1	0	0	0	0	0	0	0
Market Size	0	1	0	0	0	0	0	0
Manufacturing Cost	0	0	1	0	0	0	0	0
Labor/Ops Cost	0	0	0	1	0	0	0	0
Price Point	0	0	0	0	1	0	0	0
Target Audience Fit	0	0	0	0	0	1	0	0
Unique Features	0	0	0	0	0	0	1	0
Patentability	0	0	0	0	0	0	0	1

Inverse of I-D Matrix								
Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
Customer Preferences	1.521447	0.683594	0.573326	0.565472	0.567029	0.606898	0.669246	0.608317
Market Size	0.570050	1.480081	0.517163	0.510079	0.475668	0.544403	0.555175	0.545508
Manufacturing Cost	0.512193	0.545812	1.356911	0.475310	0.403212	0.449620	0.469638	0.450542
Labor/Ops Cost	0.519307	0.553393	0.500757	1.356911	0.408812	0.455864	0.476161	0.456800
Price Point	0.503782	0.523396	0.433621	0.427681	1.323019	0.456339	0.476235	0.444578
Target Audience Fit	0.569387	0.590389	0.465686	0.459307	0.454247	1.424491	0.572670	0.551135
Unique Features	0.474423	0.479766	0.413087	0.407428	0.391546	0.494816	1.389985	0.508683
Patentability	0.510883	0.529681	0.435110	0.429149	0.412346	0.518044	0.551349	1.394975

- **Step 4: Total Relation Matrix (TRM)**
    - Combined direct and indirect influences to show overall impact flows among factors.

Total Relation Matrix (TRM)

Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent	R
Customer Preferences	0.521447	0.683594	########	0.565472	0.567029	0.606898	0.669246	0.608317	4.795327
Market Size	0.570050	0.480081	########	0.510079	0.475668	0.544403	0.555175	0.545508	4.198128
Manufacturing Cost	0.512193	0.545812	########	0.475310	0.403212	0.449620	0.469638	0.450542	3.663238
Labor/Ops Cost	0.519307	0.553393	########	0.356911	0.408812	0.455864	0.476161	0.456800	3.728005
Price Point	0.503782	0.523396	########	0.427681	0.323019	0.456339	0.476235	0.444578	3.588652
Target Audience Fit	0.569387	0.590389	########	0.459307	0.454247	0.424491	0.572670	0.551135	4.087312
Unique Features	0.474423	0.479766	########	0.407428	0.391546	0.494816	0.389985	0.508683	3.559734
Patentability	0.510883	0.529681	########	0.429149	0.412346	0.518044	0.551349	0.394975	3.781537
C	4.181471	4.386112	########	3.631337	3.435878	3.950475	4.160458	3.960538	
AVERAGE	0.490655		STD DEV	0.072872					
	Threshold	0.490655							

- **Step 5: Prominence (R + C)**
    - Row sum (R) = total influence a criterion exerts.
    - Column sum (C) = total influence received by a criterion.
    - **R + C** = importance of the factor in the system.

Prominence and Relation calculation

Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
Customer Preferences	0.521447	0.683594	########	0.565472	0.567029	0.606898	0.669246	0.608317
Market Size	0.570050	0.480081	########	0.510079	0.475668	0.544403	0.555175	0.545508
Manufacturing Cost	0.512193	0.545812	########	0.475310	0.403212	0.449620	0.469638	0.450542
Labor/Ops Cost	0.519307	0.553393	########	0.356911	0.408812	0.455864	0.476161	0.456800
Price Point	0.503782	0.523396	########	0.427681	0.323019	0.456339	0.476235	0.444578
Target Audience Fit	0.569387	0.590389	########	0.459307	0.454247	0.424491	0.572670	0.551135
Unique Features	0.474423	0.479766	########	0.407428	0.391546	0.494816	0.389985	0.508683
Patentability	0.510883	0.529681	########	0.429149	0.412346	0.518044	0.551349	0.394975
	Threshold	0.527091						

Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
Customer Preferences	0.521447	0.683594	########	0.565472	0.567029	0.606898	0.669246	0.608317
Market Size	0.570050	0.480081	########	0.510079	0.475668	0.544403	0.555175	0.545508
Manufacturing Cost	0.512193	0.545812	########	0.475310	0.403212	0.449620	0.469638	0.450542
Labor/Ops Cost	0.519307	0.553393	########	0.356911	0.408812	0.455864	0.476161	0.456800
Price Point	0.503782	0.523396	########	0.427681	0.323019	0.456339	0.476235	0.444578
Target Audience Fit	0.569387	0.590389	########	0.459307	0.454247	0.424491	0.572670	0.551135
Unique Features	0.474423	0.479766	########	0.407428	0.391546	0.494816	0.389985	0.508683
Patentability	0.510883	0.529681	########	0.429149	0.412346	0.518044	0.551349	0.394975
	Threshold	0.563527						

Criteria \ Criteria	CustPref	MarketSize	MfgCost	Labor/Ops	PricePoint	TargetFit	UniqueFeat	Patent
Customer Preferences	0.521447	0.683594	########	0.565472	0.567029	0.606898	0.669246	0.608317
Market Size	0.570050	0.480081	########	0.510079	0.475668	0.544403	0.555175	0.545508
Manufacturing Cost	0.512193	0.545812	########	0.475310	0.403212	0.449620	0.469638	0.450542
Labor/Ops Cost	0.519307	0.553393	########	0.356911	0.408812	0.455864	0.476161	0.456800
Price Point	0.503782	0.523396	########	0.427681	0.323019	0.456339	0.476235	0.444578
Target Audience Fit	0.569387	0.590389	########	0.459307	0.454247	0.424491	0.572670	0.551135
Unique Features	0.474423	0.479766	########	0.407428	0.391546	0.494816	0.389985	0.508683
Patentability	0.510883	0.529681	########	0.429149	0.412346	0.518044	0.551349	0.394975

- **Step 6: Relation (R – C)**

- Positive (R – C) → **Cause factor** (driver).
- Negative (R – C) → **Effect factor** (dependent).

	R	C	R+C	R-C
Customer Preferences	4.79533	4.18147	8.97680	0.61386
Market Size	4.19813	4.38611	8.58424	-0.18798
Manufacturing Cost	3.66324	3.69566	7.35890	-0.03242
Labor/Ops Cost	3.72800	3.63134	7.35934	0.09667
Price Point	3.58865	3.43588	7.02453	0.15277
Target Audience Fit	4.08731	3.95047	8.03779	0.13684
Unique Features	3.55973	4.16046	7.72019	-0.60072
Patentability	3.78154	3.96054	7.74207	-0.17900

	Prominence		Relation	
Factors	R+C	Rank	R-C	Indentity
Customer Preferences	8.97680	1	0.61386	Cause
Market Size	8.58424	2	-0.18798	Effect
Manufacturing Cost	7.35890	7	-0.03242	Effect
Labor/Ops Cost	7.35934	6	0.09667	Cause
Price Point	7.02453	8	0.15277	Cause
Target Audience Fit	8.03779	3	0.13684	Cause
Unique Features	7.72019	5	-0.60072	Effect
Patentability	7.74207	4	-0.17900	Effect

- **Step 7: Findings**
  - **Cause Factors (Drivers):** Customer Preferences (+0.61), Price Point (+0.15), Target Audience Fit (+0.14), Labor/Ops Cost (+0.09).
  - **Effect Factors:** Market Size (–0.18), Patentability (–0.17), Unique Features (–0.60), Manufacturing Cost (–0.03).

Cause and Effect Factors

Cause (Driver) Factors

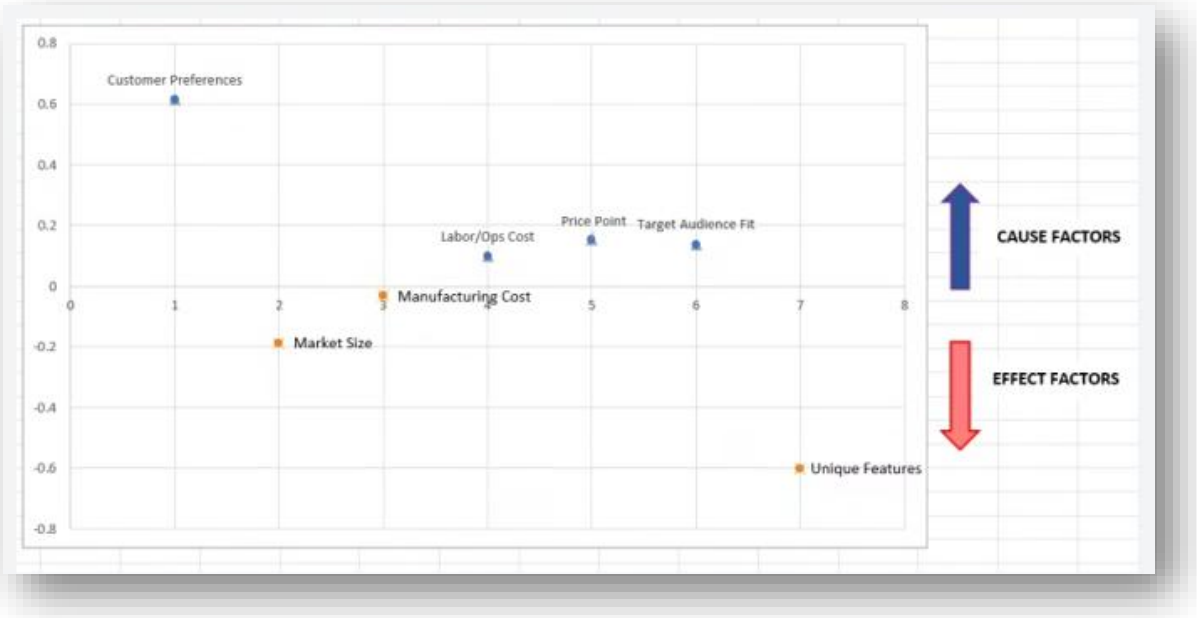
- **Customer Preferences** → Emerged as the strongest driver, shaping nearly all other factors including market size and adoption rates.
- **Target Audience Fit** → Acts as a bridge, translating farmer preferences into actual adoption pathways.
- **Price Point & Labor/Ops Cost** → Function as linkage criteria, mediating between production realities and farmer affordability.

- **Manufacturing Cost** → Moderate driver, directly tied to operational feasibility and pricing strategy.

Effect Factors (Outcomes)

- **Market Size** → Heavily dependent on upstream drivers like preferences and audience targeting, rather than acting as an independent driver.
- **Unique Features** → Found to be largely an outcome of R&D and strategic direction, rather than an independent determinant of adoption.

Visualization (Cause–Effect Map)



The DEMATEL scatter plot clearly shows Customer Preferences positioned in the "Cause" quadrant, reinforcing its role as the dominant driver. Meanwhile, Market Size and Unique Features fall in the "Effect" zone, highlighting their dependency on upstream levers. Price Point, Target Audience Fit, and Labor/Ops Cost cluster as mediators, indicating that they both shape and are shaped by other factors.

Managerial Implications

- Strengthening customer-centric research and segmentation yields the highest downstream impact.
- Pricing models and operational efficiencies act as levers that can accelerate adoption if aligned with farmer willingness-to-pay.
- Investing resources solely in outcomes like market expansion without addressing upstream drivers would be inefficient.
- For Corteva, the findings emphasize that farmer-first innovation and precise targeting are the most effective ways to build sustainable growth.

Strategic Insights

The results of the AHP–TOPSIS–DEMATEL framework highlight not only which products should be prioritized but also how Corteva should think about positioning, pricing, sequencing, and risk. The value of these insights lies in translating quantitative scores into strategic narratives that guide real-world decisions.

1. Tiered Launch Strategy

The rankings create a natural two-tier structure. AquaMax Ultra Maize (P1) and NutriMax Trait (P4) stand out as clear frontrunners and should be prioritized for a Phase-1 launch. BioShield Pesticide (P2) and MycoGuard Fungicide (P5) represent a Phase-2 pipeline, with launches staggered to manage resources and reduce portfolio risk. GranularX Digital Advisory (P3), while scoring lowest, should not be discarded but repositioned as a digital support platform to strengthen farmer loyalty and complement the flagship products.

2. Competing Beyond Price

Patentability and unique features, though lower in weight, play a decisive role in avoiding commoditization. AquaMax must be framed as a climate resilience solution rather than just a maize seed, while NutriMax Trait's defensibility lies in its patent portfolio. These differentiators give Corteva the chance to pursue value-driven positioning and avoid price wars with competitors.

3. Price Sensitivity as a Strategic Lever

Sensitivity analysis revealed that mid-tier products, especially BioShield, become more competitive when pricing is weighted heavily. This implies Corteva must adopt a dual pricing playbook:

- **Premium pricing** for differentiated products (AquaMax, NutriMax), justified by higher yield and resilience.
- **Volume pricing** for affordability-focused products (BioShield, MycoGuard), targeting price-sensitive smallholder markets.

4. Customer-Centric Drivers

DEMATEL analysis highlighted that Customer Preferences and Target Audience Fit are causal drivers, while costs and market size are dependent outcomes. This finding underscores a critical insight: cost efficiency follows adoption, not the other way around. Corteva must therefore invest upstream farmer-centric R&D, precise targeting, and demand stimulation knowing that downstream benefits in scale and cost efficiency will follow.

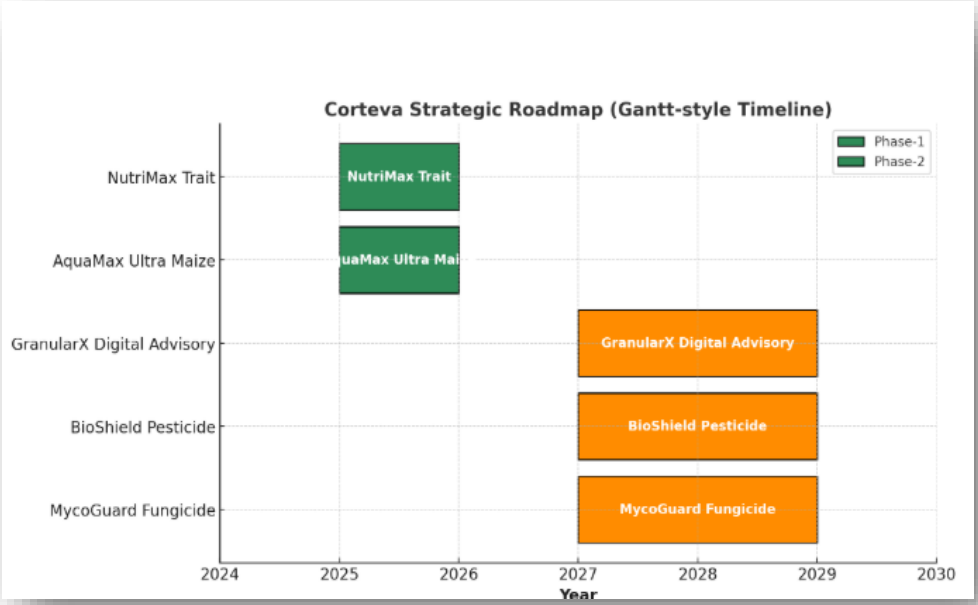
5. Geographic Sequencing

Different products lend themselves to different markets. AquaMax should lead in drought-prone geographies, NutriMax in regions with strong IP protections, BioShield in cost-sensitive emerging markets, and MycoGuard in regions facing fungal outbreaks. GranularX is best suited to advanced markets where digital advisory complements seed and trait adoption.

Conclusion

Corteva's launch strategy must be sequenced and selective, not opportunistic. By applying AHP, TOPSIS, and DEMATEL, this report establishes a transparent, data-driven roadmap that balances short-term ROI with long-term resilience.The integrated decision-making framework points to clear priorities for Corteva's product launch strategy. To translate insights into action, we recommend the following steps:

1. Launch Sequencing



- Phase 1: Advance AquaMax Ultra Maize (P1) and NutriMax Trait (P4) as flagship products. Both score highest across weighted criteria and align strongly with Corteva's sustainability and innovation goals.
- Phase 2: Develop BioShield Pesticide (P2) and MycoGuard Fungicide (P5) through targeted regional pilots, market education campaigns, and progressive scale-up once Phase-1 launches stabilize.
- Phase 3/Repositioning: Reframe GranularX Digital Advisory (P3) as a supportive digital ecosystem rather than a standalone launch. Use it to enhance loyalty, data-driven insights, and adoption of Tier-1 and Tier-2 products.

2. Pricing and Market Segmentation

- Adopt a dual pricing playbook:
- Premium pricing for differentiated, high-value products (AquaMax, NutriMax) to capture margin in developed and progressive markets.

- Volume pricing for affordability-driven products (BioShield, MycoGuard), targeting smallholder-dominated geographies.
    1. This two-pronged approach balances profitability with accessibility, ensuring resilience against price shocks and competitive pressures.

3. Regulatory and Compliance Alignment

- For NutriMax Trait, allocate resources early to build robust regulatory dossiers and accelerate patent approvals in key geographies.
- Maintain a 10–15% compliance buffer in the launch budget to absorb regulatory or market-entry delays.

4. Sustainability as a Differentiator

Frame AquaMax as a climate-resilient seed solution and NutriMax as a patent-backed sustainable trait innovation. Position BioShield and MycoGuard as eco-friendly protection solutions to align with global sustainability narratives.

5. Organizational Integration

- **R&D**: Double down on farmer-centric innovation.
- **Marketing**: Create segmented campaigns based on premium vs. volume strategies.
- **Operations**: Scale flexibly with adoption curves rather than fixed forecasts.
- **Regulatory Affairs**: Engage early with policymakers and farmer groups to de-risk launches.

By executing a phased rollout, adopting dual pricing, embedding sustainability narratives, and aligning internal teams, Corteva can transform analytical results into a cohesive, boardroom-ready launch strategy that maximizes both short-term adoption and long-term competitive advantage.