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Illumina

Innovation in Genomic Sequencing – Strategy & Competitive Positioning

Prepared for :
Competitive Strategies

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WHILE **AI AND GENOMICS** PROMISE **TRANSFORMATIVE BENEFITS TO THE MEDICAL FIELD,** CONCERNS OVER **CONSUMER DATA PRIVACY,** ETHICAL CONSIDERATIONS, AND THE **THREAT OF INTERNATIONAL COMPETITION** SUCH AS DEEPSEEK POSE **GREAT UNCERTAINTY** TO WIDESPREAD ADOPTION.

SOCIAL

Concerns around genetic data privacy and AI-driven healthcare decisions could impact adoption.

Demographics show varying acceptance levels

Ethical dilemmas related to AI-powered diagnostics and genetic testing may require regulatory acceptance.

Increasing need for precision medicine solutions for age-related diseases (Cancer, Alzheimer's)

TECHNOLOGICAL

Integration with existing healthcare systems and workflows

AI capabilities in early disease detection and diagnosis

The AI revolution in healthcare is transforming drug discovery, disease detection, and diagnostics.

Cheaper, faster, and more efficient sequencing methods are being developed driving the need for continuous innovation.

ECONOMICAL

US government AI investment creates funding opportunities but raises competitive pressure.

The cost of genome sequencing has plummeted, making genomics more accessible but reducing profit margins.

Economic disparities in access to AI healthcare solutions

Adoption of AI could lead to savings of 5 to 10 percent in US healthcare spending

ENVIRONMENTAL

The biotech industry is under pressure to reduce its environmental footprint.

Environmental health determinants, such as air quality and climate-related diseases, may increase demand for genomic solutions tailored to these challenges

Energy consumption of AI systems and data center

POLITICAL

Political tensions and geopolitical instability could affect global supply chains, regulatory approvals, and market expansion strategies.

Trade restrictions, tariffs, and diplomatic conflicts could increase manufacturing costs, delay access to critical raw materials, and limit international sales.

U.S. government initiatives like Stargate Alliance may provide indirect benefits through increased funding for genomics research as part of national security priorities

Privacy and data protection legislation

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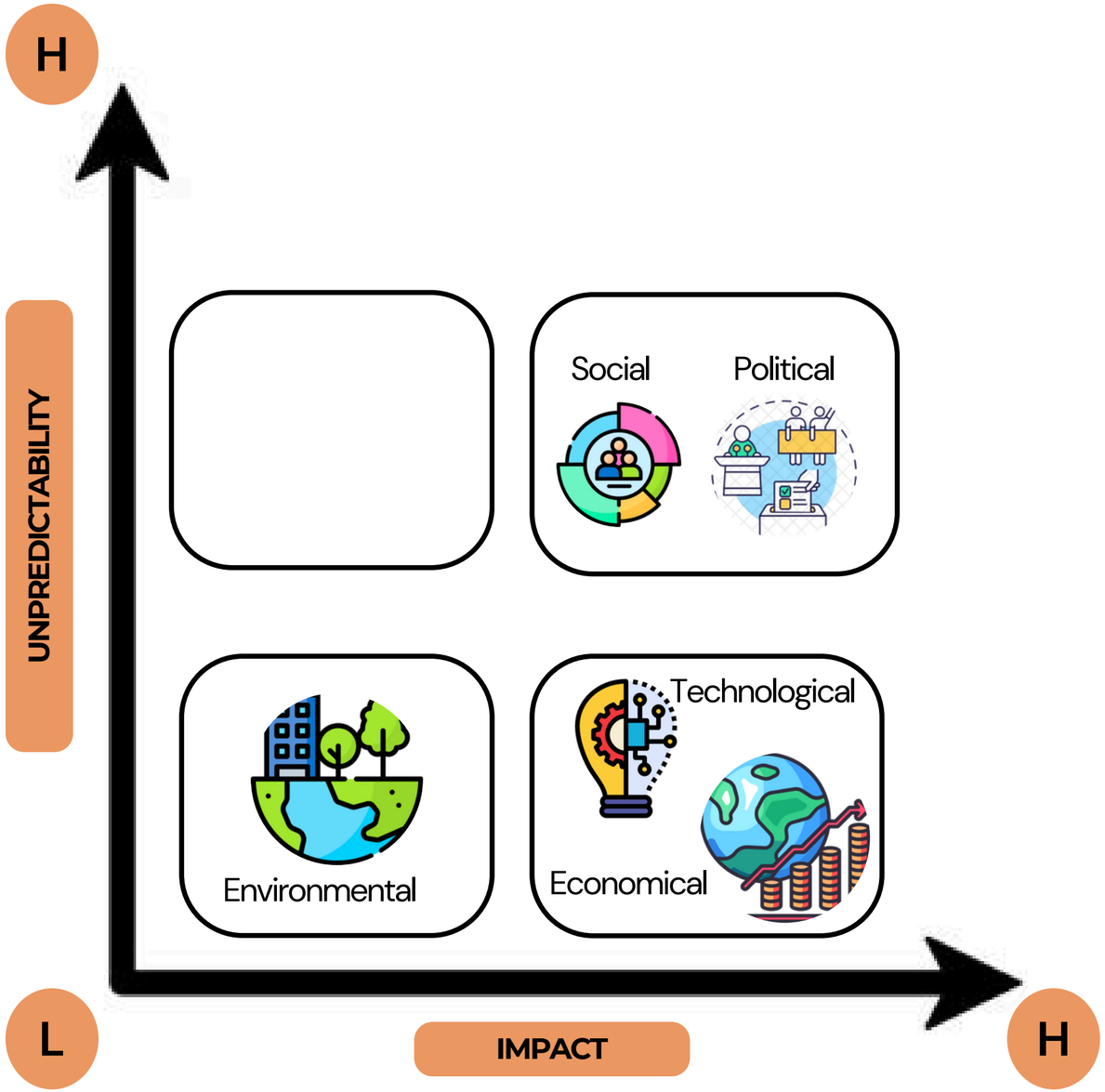
THE RAPIDLY EVOLVING MEDICAL TECHNOLOGY SEASCAPE DEMANDS CONSTANT VIGILANCE, AS **SHIFTING CONSUMER PREFERENCES** AND **SUDDEN AND SIGNIFICANT AI ADVANCEMENTS** RESHAPE GLOBAL HEALTHCARE INNOVATION



Social Acceptance of AI in healthcare

High Social Acceptance

Widespread social acceptance of AI in healthcare will accelerate the adoption of AI-powered genomic sequencing, enabling faster and more accurate disease prediction and personalized medicine. By aligning with AI-driven healthcare innovations, Illumina can expand its market presence, enhance predictive analytics, and solidify its leadership in next-generation sequencing.

Low Social Acceptance

Slow down the adoption of AI-powered genomic sequencing, limiting its role in disease prediction and personalized medicine. Stricter regulations and public concerns over data privacy and bias may lead to longer approval timelines, increasing costs and delaying innovations.

Political war in AI development

Political War Intensifies

Illumina relies on global suppliers for key components like semiconductors, reagents, and lab equipment. Trade restrictions or sanctions (e.g., U.S.-China tensions) could disrupt supply chains, leading to higher costs and production delays.
Political conflicts can lead to new trade regulations, tariffs, or restrictions on biotech exports/imports.

Political War Subsides

Illumina can strengthen its supply chain, ensuring uninterrupted access to raw materials and lowering manufacturing costs. This will enable faster production cycles and greater investments in AI-driven genomics, enhancing data analytics and sequencing accuracy.

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CONSUMER TRUST IN DATA PRIVACY AND **INTERNATIONAL AI DEVELOPMENT LEADERSHIP** WILL DETERMINE WHETHER ILLUMINA'S **AI-DRIVEN GENOMICS TRANSFORMS HEALTHCARE WORLDWIDE** OR REMAINS A **NICHE TECHNOLOGY**

High Social Acceptance

Political war intensifies

Political War in AI development

Political war subsides

Social Acceptance of AI in healthcare

Low Social Acceptance

The Red Dragon's Remedy

- *China becomes the global leader in AI and genomic healthcare, leveraging its regulatory environment and extensive data resources*
- *Consumers worldwide accept AI-driven healthcare, including genetic diagnostics, preventive and preemptive care solutions*

Gold Standard for AI in Genomics

- *The US leads the AI race, fostering global collaborations and setting ethical data standards*
- *Advances in AI and genomics are seamlessly integrated into healthcare, supported by widespread social acceptance.*

Fragmented Futures in Global Healthcare

- *China's dominance in AI-driven healthcare innovation is undeniable, with groundbreaking advances in genomics and predictive medicine*
- *Privacy breaches and concerns about authoritarian surveillance erode public confidence in AI-driven healthcare, particularly in liberal democracies*

Struggles to Win Consumer Trust in AI Healthcare

- *Despite technological dominance, US-led AI developments struggle to gain traction in healthcare due to persistent privacy concerns and ethical opposition.*
- *Consumers reject AI-driven preemptive medicine, limiting its adoption to niche applications.*

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CHINA'S DOMESTIC AI CHIP DEVELOPMENT, AI INFRASTRUCTURE DOMINANCE, AND CONSUMER TRUST SURROUNDING GENETIC DATA WILL EMERGE AS KEY FACTORS SHAPING THE HEALTHCARE MARKET

High Social Acceptance

Insurgents

Chinese genomics AI startups thrive, expanding globally. US AI healthcare insurgents struggle and seek partnerships outside the US to survive.

InferVision

Incumbents

Chinese incumbents expand influence in global genomics. US firms struggle to compete internationally, facing a strong competitive disadvantage.

BGI Roche

Adjacents

Adjacents face pressure as China develops its own AI chips, reducing dependence on US tech. Wearable tech companies comply with China's data laws.

NVIDIA

Insurgents

Partner with US hospitals for AI-driven drug discovery. Launch and scale direct-to-consumer genetic therapies.

deep genomics GRAIL

Incumbents

US companies capture major market share, sidelining China. Chinese firms face barriers from US policies & struggles internationally.

ThermoFisher SCIENTIFIC Roche

Adjacents

Adjacents expand AI chips & infrastructure for healthcare AI. Scale AI-driven healthcare solutions, pushing AI-powered wearable.

NVIDIA Google

Political war intensifies

Political War in AI development

Political war subsides

Social Acceptance of AI in healthcare

Insurgents

US insurgents face stagnation and seek pivots into non-healthcare AI applications, they sell IP to Chinese firms to survive in Chinese-dominated market.

deep genomics GRAIL

Incumbents

Face roadblocks in global expansion, retain market share through traditional genomics & diagnostics, focusing on hybrid models rather than full AI.

BGI ThermoFisher SCIENTIFIC

Adjacents

Remove health AI features in regions with low acceptance. Shift focus to traditional demand.

NVIDIA

Insurgents

Slower growth for AI-based startups, they pivot to non-clinical verticals like AI-powered drug discovery instead of direct patient care.

deep genomics VERGE genomics

Incumbents

Focus on traditional genomics & diagnostics. Meanwhile finding international markets outside the US, where AI regulation is looser.

Roche ThermoFisher SCIENTIFIC

Adjacents

Use AI for backend hospital logistics. Target non-US markets with higher AI acceptance. Shift to general health tracking & fitness.

Google NVIDIA

Low Social Acceptance

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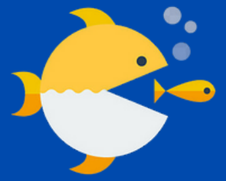
ILLUMINA WOULD BE BEST SERVED PURSUING OPPORTUNITIES IN **AI-DRIVEN PREDICTIVE MEDICINE**, **GENOMICS INTEGRATION**, AND **REGULATORY COMPLIANCE**, WHILE CAREFULLY MONITORING THREATS SUCH AS **COMPETITION FROM GLOBAL TECH GIANTS**

DRIVERS

- ***Political war*** *can drive increased government funding for AI-driven healthcare and biotech advancements, enabling Illumina to accelerate genomic research and precision medicine innovations. Geopolitical tensions and trade restrictions may disrupt Illumina's global supply chain, increasing costs and delaying access to critical AI technologies*
- *High* ***social acceptance of AI*** *will accelerate Illumina's growth in precision medicine, while low acceptance may slow innovation due to regulatory hurdles and limited AI adoption.*

OPPORUNITIES

- ***AI-Powered Preventive Healthcare:*** *Lead the transition to digital-first, preemptive care by integrating genomics with AI-driven predictive analytics.*
- ***Strategic partnerships:*** *Leverage partnerships with NVIDIA, Myriad Genetics, and others to create a ecosystem*
- ***Health Data Advocacy and Leadership:*** *Establish Illumina as an industry leader in ethical data usage, privacy-compliant genomic services, and regulatory advocacy for data harmonization.*



THREATS

- ***Competitive Landscape:*** *Rising competition from Chinese startups like DeepSeek and global tech giants such as Google Health, Apple, and Amazon entering the healthcare space.*
- ***Public Distrust in AI Healthcare:*** *Privacy concerns slowing adoption of AI-driven genomic solutions despite technological advancements.*
- ***Regulatory Challenges:*** *Increasing scrutiny over AI models in healthcare could lead to stricter regulations, delaying product launches or increasing compliance costs*

STRATEGY

- ***Collaborate Actively:*** *Partner with key players in the alliance (e.g., NVIDIA) to co-develop advanced genomic-AI solutions.*
- ***Invest in R&D:*** *Use the infrastructure to accelerate innovation in predictive analytics and multiomics integration.*
- ***Data Management:*** *Establish secure data sharing protocols while maintaining privacy compliance*
- ***Ecosystem Role:*** *Create shared value for key stakeholders: patients, providers, payers, policymakers, and pharma*
- ***Expand Market Reach:*** *Use cost reductions enabled by advanced infrastructure to democratize access to preventive healthcare globally.*

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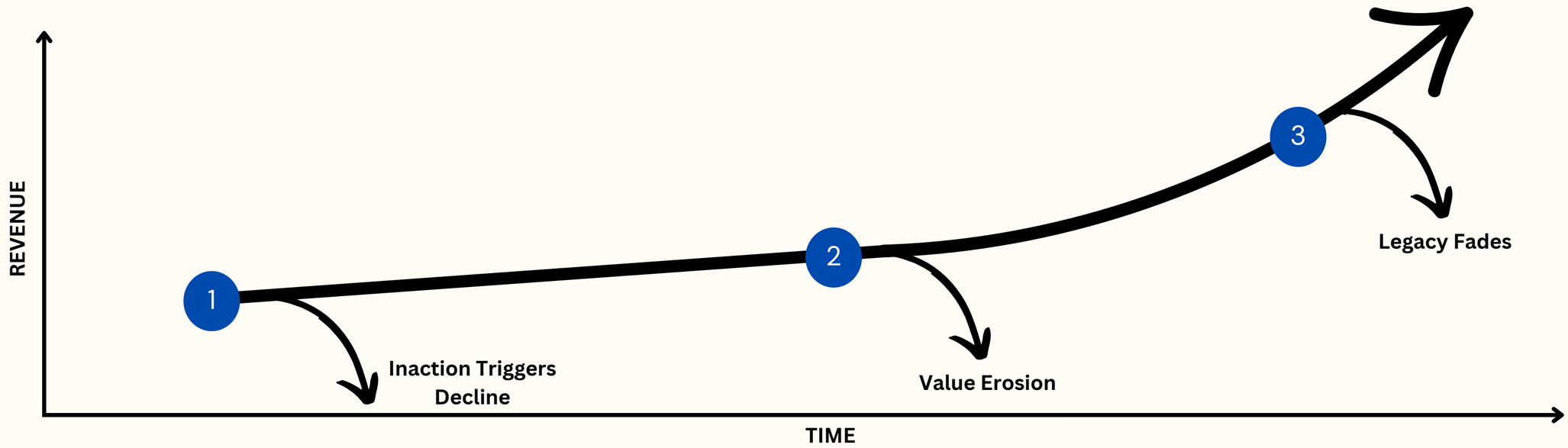
BY INVESTING IN **AI-DRIVEN GENOMICS,** CONSUMER TRUST IN AI IN MEDICINE, AND **DATA-SHARING FRAMEWORKS**, ILLUMINA IS POSITIONED TO **LEAD EXPANSION INTO PREVENTATIVE MEDICINE** AND TO ULTIMATELY BECOME A **MEDICAL AI ECOSYSTEM ORCHESTRATOR**



Phase 1 - Invest (0-2 yrs)

- *Invest to expand **AI-driven bioinformatics and genetic sequencing** platforms*
- *Strengthen existing strategic AI **partnerships** (NVIDIA) through **continued business and collaborative research projects***
- *Develop **data-sharing pathways and frameworks** to **facilitate collaboration** amongst medical AI companies.*
- *Work with regulatory bodies to both ensure current and future compliance and prioritize customer data security to **build public trust**.*

Phase 2 - Capitalize (2-4 yrs)

- *Develop AI-driven medical technology for **early diagnostics and disease prediction/prevention***
- ***Partner with pharmaceutical companies** to capitalize on insights gathered via **genetics/genomics** products*
- *Further develop data sharing pathways to include **decentralized data compartments to ensure patient safety***
- *Integrate past and present technology with **hospital systems and/or government organizations***

Phase 3 - Expand (4-6 yrs)

- *Expand into **direct-to-consumer tailor-built AI genomics products***
- ***Expand** into **multi-omics space** (combining genomics, proteomics, and metabolomics) for **comprehensive health evaluations** and assistance in predictive/preventative space.*
- *Leverage AI capabilities and previously build infrastructure to **conduct population health checks and provide insights/recommendations at scale**.*
- *Position Illumina as **market leader** in the new age of **medical tech***

TIMELINE = 6 YEARS

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THANK YOU

-OPEN FOR Q&A

PRESENTED BY:

Nishant Rana

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EXECUTIVE SUMMARY

1. WHILE **AI AND GENOMICS** PROMISE **TRANSFORMATIVE BENEFITS TO THE MEDICAL FIELD,** CONCERNS OVER **CONSUMER DATA PRIVACY,** ETHICAL CONSIDERATIONS, AND THE **THREAT OF INTERNATIONAL COMPETITION** SUCH AS DEEPSEEK POSE **GREAT UNCERTAINTY** TO WIDESPREAD ADOPTION.

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3. **CONSUMER TRUST** IN DATA PRIVACY AND **INTERNATIONAL AI DEVELOPMENT LEADERSHIP** WILL DETERMINE WHETHER **AI-DRIVEN GENOMICS TRANSFORMS HEALTHCARE WORLDWIDE** OR REMAINS A **NICHE TECHNOLOGY**

4. **CHINA'S DOMESTIC AI CHIP DEVELOPMENT, AI INFRASTRUCTURE DOMINANCE, AND CONSUMER TRUST SURROUNDING GENETIC DATA** WILL EMERGE AS KEY FACTORS SHAPING THE HEALTHCARE MARKET

5. ILLUMINA WOULD BE BEST SERVED PURSUING OPPORTUNITIES IN **AI-DRIVEN PREDICTIVE MEDICINE**, **GENOMICS INTEGRATION**, AND **REGULATORY COMPLIANCE**, WHILE CAREFULLY MONITORING THREATS SUCH AS **COMPETITION FROM GLOBAL TECH GIANTS**

6. BY INVESTING IN **AI-DRIVEN GENOMICS,** CONSUMER TRUST IN AI IN MEDICINE, AND **DATA-SHARING FRAMEWORKS,** ILLUMINA IS POSITIONED TO **LEAD EXPANSION INTO PREVENTATIVE MEDICINE** AND TO ULTIMATELY BECOME A **MEDICAL AI ECOSYSTEM ORCHESTRATOR**