MARKET & COMPETITIVE MONOGRAPH

Holding the *Premium Line*

A merchant X-ray-detector maker defending image-quality margins as Chinese cost and OEM in-sourcing squeeze the merchant market — and the last Korean detector house still in profit.

KOSDAQ 100120 · Vieworks Co., Ltd.

The detector market grows in units and shrinks in price; the only defensible ground is the premium edge — and that is the one patch Vieworks still holds.

FY2025 revenue	OP margin · 1Q26	Est. merchant-FPD share	Europe share of revenue
₩239.3bn	**8.9% → 15.1%**	**~10–12%**	**~38%**

Prepared for a consulting firm conducting market and competitive analysis of the global X-ray flat-panel-detector and medical-imaging sector, with Vieworks as the lens. This is a market-research and business-analysis monograph, not an equity-research note: it carries no price target, no valuation, and treats sell-side numbers only as third-party market forecasts.

Evidence base · DART Annual Report FY2025 (rcept 20260323001685) + 7-yr structured consolidated financials; peer DART (DRTECH 20260320001313, Rayence 20260316001022); sell-side notes (LS Securities, Eugene Investment); and adversarially-verified market research (Mordor, Signify Research, GM Insights, MarketsandMarkets, Grand View, Fortune Business Insights). Figures cited inline. · Seoul · 2026-06-17

Contents

SIX SECTIONS · ~29 PAGES

The monograph is built around a single market-research spine — a **component market caught between rising volumes and falling prices**. The X-ray-detector market grows only mid-single-digit because every extra unit ships at a lower price, squeezed from below by Chinese cost (iRay) and from the side by OEMs that make their own detectors (Trixell, Canon). The report reads Vieworks as a position within that structure: the Korean detector house that climbed to the **premium edge** — and is, on the latest evidence, the only one of its domestic peers still in profit.

HOW TO READ THIS DOCUMENT

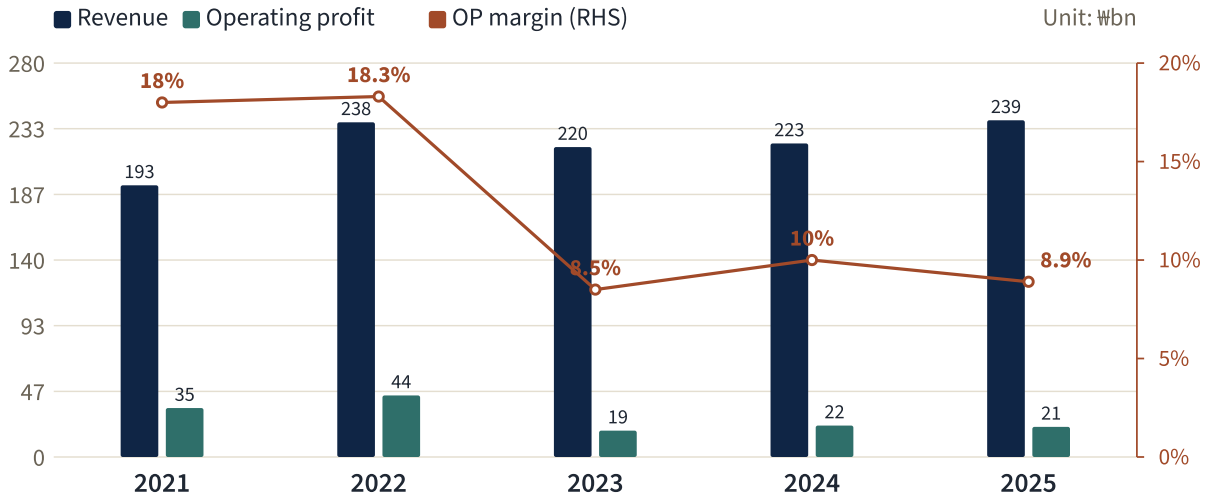
The number that frames the market is not a size but a **law of motion**: "rising volumes, falling prices." Detector units grow as the world digitizes X-ray, but average selling prices fall faster in commodity a-Si than volume rises — so the only way a merchant maker defends its margin is to move *up* the product ladder (glassless, CMOS, dynamic, mammography) and *out* into industrial inspection. This monograph is the story of one company doing exactly that, against competitors who can either out-cost it (China) or foreclose its customers (the OEMs).

Executive Summary

THE MARKET THESIS

Vieworks Co. (KOSDAQ 100120) is a 1999-founded Korean maker of **X-ray flat-panel detectors (FPD)** — the digital image sensor at the heart of every modern radiography machine — with a fast-growing second leg in **machine-vision cameras** for industrial inspection. It sells the *component*, not the machine: its detectors sit, largely OEM/ODM, inside other brands' X-ray systems. That places it in a market with a punishing structural law — **rising volumes, falling prices** — where the detector layer grows only ~5–6% a year even as the systems built on top grow ~8%, because average selling prices erode and value migrates up to software and the OEM.

Exhibit 1 · The margin reset: an ~18% business that re-based to ~9% in 2023, with revenue still at a record



Source: DART 20260323001685 (Annual Report FY2025), 7-yr structured consolidated financials. OP margin on right-hand 0–20% scale. Revenue reached a record ₩239.3bn in FY2025; OP margin sits at roughly half its pre-2023 level.

The company's own five-year record is the market in miniature. Through FY2022 Vieworks earned an **~18% operating margin** — a premium-detector maker pricing on image quality. Then in FY2023 the margin *halved to 8.5%* and has stayed near there, even as revenue climbed to a record ₩239.3bn in FY2025. That reset was not a stumble; it was the market arriving — Chinese vertically-integrated supply (iRay) compressing prices, a dynamic/dental softness, and the cost of building new legs (industrial detectors, digital pathology). The live signal is that **1Q26 operating margin recovered to ~15.1%**, the first improvement in thirteen quarters, on cost discipline and a medical/industrial demand recovery.

Vieworks is a **premium-tilted merchant detector specialist holding the one defensible patch of a structurally squeezed market** — the image-quality edge plus a fast-growing industrial leg — and, on the latest evidence, the only Korean detector house still in profit. Five findings follow.

Five findings a market team should anchor on

1 **The market's law is volumes-up, prices-down.** The detector component market is ~USD 3.4–4.2bn growing ~5.5–6.4%, inside a ~USD 15bn digital-X-ray-system market growing ~8% — the gap is ASP erosion, worst in commodity a-Si. The only margin defense is mix-up (glassless, CMOS, dynamic, mammography) and a move into industrial inspection Signify; Mordor; GM Insights.

2 **Growth lives at the edges, not the core.** General radiography — the volume base — grows ~3%; the money is in DBT mammography (~13.8%), dental/CBCT (~9–10%), machine-vision cameras (~8.6%), and the steepest edge, secondary-battery X-ray inspection (~15%). Vieworks' growth lines (industrial +44%, machine-vision recovering) sit on these edges Mordor; MarketsandMarkets; Valuates.

3 **China is the double-edge.** Asia-Pacific is both the fastest-growing demand region (~8.6%) and the source of the most aggressive low-cost supply: iRay, CareRay and Suzhou Semi-circle make up ~50% of China's detector exports. iRay — ~28% net margin, vertically integrated — has now *passed Vieworks on revenue scale* and is climbing into its premium tiers Signify; Volza.

4 **The merchant market is being foreclosed from the side.** A large slice of detector demand is captive: Trixell supplies its co-owners Siemens and Philips; Canon, Fujifilm and Konica self-supply their own systems. Every OEM that makes its own detector is demand removed from a merchant like Vieworks — a structural narrowing of the addressable pool diagnosticimaging; company filings.

5 **Vieworks is the relative survivor.** All three Korean detector merchants compressed in 2023–2025, but only Vieworks stayed profitable: FY2025 OP margin ~8.9% versus Rayence at a −3.4% loss and DRTECH at −11.9%. Its premium and industrial mix is exactly what kept it above water DART: 100120 / 228850 / 214680.

> **The read for the brief.** Vieworks is a structurally sound, R&D-heavy (10.8% of sales) premium-niche detector maker that survived the price reset better than any domestic peer and is re-basing margin upward. The question to price: whether its two escape routes — **up** the premium ladder and **out** into industrial inspection and digital pathology — scale fast enough to outrun the Chinese cost ascent and OEM in-sourcing.

1 The Market

VOLUMES UP, PRICES DOWN

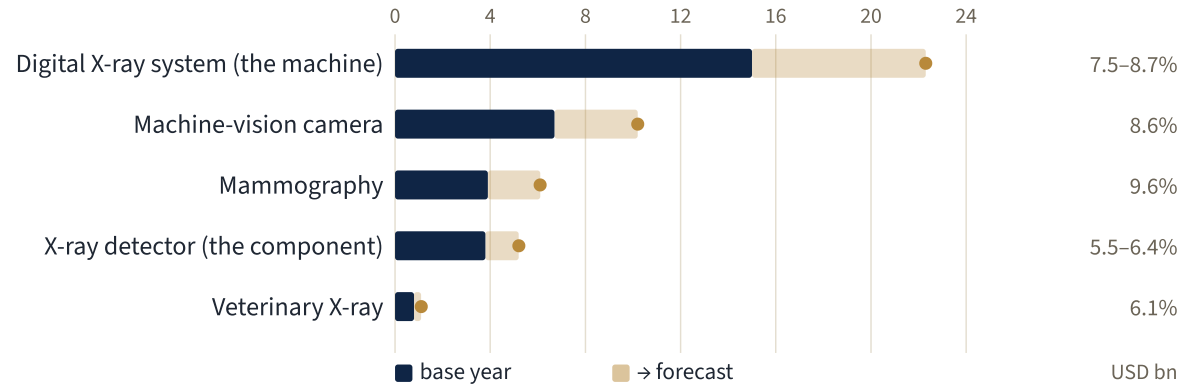
Before any company can be placed, the market has to be scoped correctly — and "digital X-ray" is one of the most mis-scoped markets in medical devices, because three different baskets carry near-identical names. Getting the layer right is the single most important analytical move in this report: Vieworks sells the **detector component**, a ~USD 3.4–4.2bn market, *not* the ~USD 15bn machine it goes into.

Three baskets, one of which is Vieworks'

- **The detector component (Vieworks' layer)** — the flat-panel sensor only. **~USD 3.4–4.2bn in 2025**, growing **~5.5–6.4%** to ~USD 4.4–7.1bn by 2030–34. FPD is ~50% of this; the rest is CR, line-scan and CCD GM Insights; MarketsandMarkets; Mordor.
- **The DR system (the machine)** — detector + generator + software + services. **~USD 14–15bn in 2025**, growing **~7.5–8.7%** — faster, because systems bundle the AI/software and the full CR→DR replacement Research and Markets; Mordor; SkyQuest.
- **The modality wrapper** — all X-ray systems (~USD 8.4bn at ~3.3%) inside total medical imaging equipment (~USD 43.5bn at ~5.1%) — the slow-growth floor under detector demand Grand View; Fortune BI.

The structural point is the *gap between the layers*: the system market grows ~8% while the detector inside it grows ~5–6%. That ~2–3-point wedge is value migrating to software, AI and the OEM's brand — the signature of "rising volumes, falling prices." A merchant maker runs up a down-escalator on price, and must add units and mix faster than ASPs fall just to hold revenue.

Exhibit 2 · The three cleanly-scoped baskets, sized 2025 → 2030 (USD bn)

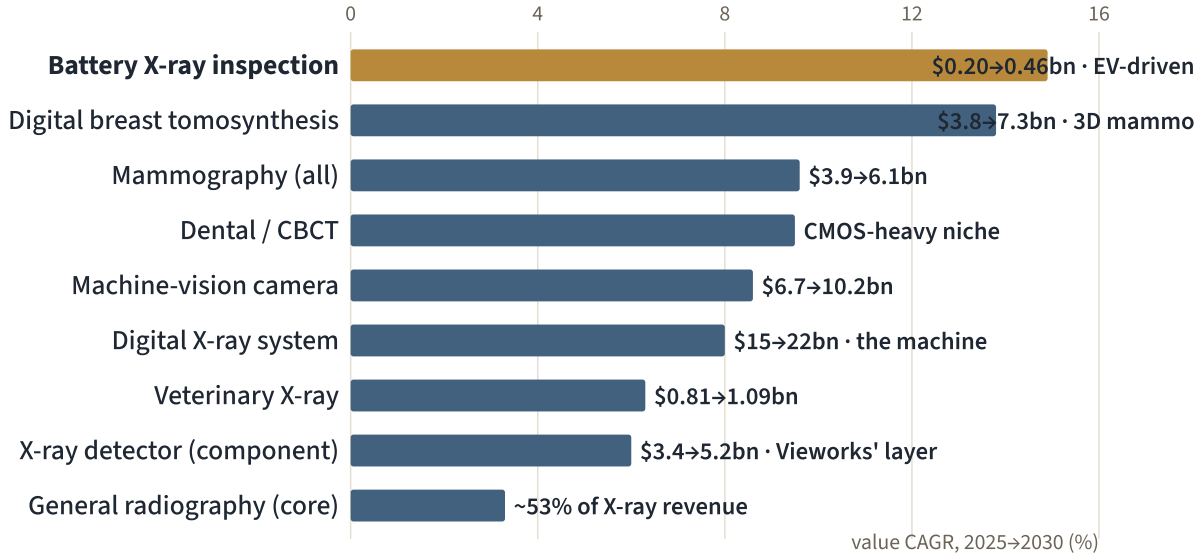


Sources: Research and Markets, Mordor, MarketsandMarkets, GM Insights, Grand View (by market, 2025→2030). Do not sum — the detector is a component inside the system.

Where the growth actually lives

If the blended detector market grows ~5–6%, the more useful question for a strategy client is *where inside it* the growth concentrates — because the dispersion is enormous. General radiography, the volume core, grows only ~3%; the genuinely attractive pockets are all at the edges, and they are exactly the higher-resolution, higher-margin niches where image quality (not price) decides the sale.

Exhibit 3 · Growth lives at the edges: served-market value CAGR, 2025→2030



Sources: Mordor (mammography, veterinary, X-ray detector), SNS Insider / IndustryArc (DBT), MarketsandMarkets (machine-vision camera), Valuates / 24marketreports (battery inspection), Grand View (general radiography). Ranges where houses diverge; midpoints shown.

Two readings matter. First, the **medical edges** — digital breast tomosynthesis (~13.8%), dental/CBCT (~9–10%), mammography (~9.6%) — reward exactly the technologies (fine pixel pitch, dynamic frame rates, glassless panels) that separate a premium maker from a commodity one. Second, the **industrial edge** is the steepest of all: secondary-battery X-ray inspection (~15%, EV-driven) and semiconductor/advanced-packaging inspection (AI-capex-driven) grow far faster than any medical line. This is why a machine-vision second leg is not a diversification luxury for a detector maker — it is the structural growth offset to a maturing medical core.

What pulls the demand, 2026–2030

Five forces drive detector demand over the planning horizon, in rough order of unit impact:

- **Analog→digital retrofit (CR→DR) and image-intensifier phase-out** — the biggest unit engine. DR is ~84% of digital-X-ray technology share and rising; every retrofit is a net-new detector socket, and the retrofit CAGR is highest in developing markets Mordor; Fortune BI.
- **Emerging-market penetration** — Asia-Pacific is ~38% of medical imaging and the fastest region at ~8.55%; low installed base per capita means greenfield, first-time-digital demand across LatAm, MEA, India and SE Asia Mordor; Fortune BI.
- **Aging population** — the 60+ cohort goes from 1.0bn (2020) to 1.4bn (2030); older patients need disproportionately more imaging, sustaining the replacement and throughput cycle WHO.
- **Industrial automation, battery & semiconductor inspection** — the machine-vision pull (~8.6%), with battery X-ray inspection (~15%) the steepest vertical; this is the detector maker's fastest demand, far above medical MarketsandMarkets; Valuates.
- **AI radiology** — a volume tailwind but a component-margin headwind: AI raises imaging throughput and favors dynamic/high-DQE detectors, but the value it creates accrues to software and the OEM, not the detector's ASP market research, ranged.

> **WHY THIS SHAPES THE WHOLE REPORT**
>
> Every driver above grows *units*; none reverses the *price* erosion. So the market rewards two strategies and punishes a third. It rewards (a) riding the high-growth edges (DBT, dental, industrial inspection) and (b) climbing the technology ladder to hold price. It punishes (c) sitting in commodity a-Si general radiography and competing on cost against vertically-integrated Chinese supply. The rest of this monograph reads Vieworks against that test.

The regional map and the China double-edge

Demand is geographically concentrated at the top and growing fastest at the bottom. **North America** is ~38–40% of digital-X-ray demand — mature, replacement-driven, and premium/dynamic/glassless-skewed, which is why it is the most attractive region for a maker selling on image quality. **Europe** is the second pool, tender-driven and an early adopter of glassless DR. **Asia-Pacific** is ~30% and the fastest-growing (~8.55%), with China DR ~6.1% and the FPD market there ~7.6% Mordor; Fortune BI; Grand View.

But China is where the market's central tension sits, and it cuts both ways for a Korean merchant maker:

THE DEMAND EDGE

China and broader APAC are the fastest-growing demand for detectors — low installed base, aggressive hospital build-out, and a retrofit wave. A cost-competitive exporter with FDA/CE access is positioned to ride it, and Vieworks' 1Q26 China revenue grew ~40% YoY off a recovering base.

THE SUPPLY EDGE

China has built a full domestic FPD supply chain — CareRay (~23% of China detector exports), Suzhou Semi-circle (~14%) and iRay (~13%) together ~50% of exports, with >70% of suppliers clustered in Guangdong. The same geography that pulls volume drives the ASP erosion that resets margins.

Two further structural shifts are re-drawing the map. **Localization** — India's "Make in India"/PLI and Indonesia's local-content rules — is pushing even Varex and Detection Technology to set up FPD production in India (2025). And **tariffs** (US reciprocal tariffs of ~15% on EU/Korea/Japan; China settled ~20% after a 125% peak) reward local manufacturing and penalize a Korea-centric exporter. For Vieworks, geography is therefore not just a demand story but a cost-of-access one — a theme that returns in the competitive section Signify; trade press.

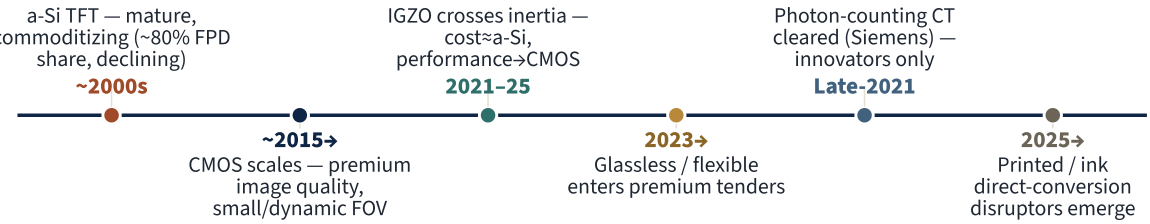
2 Technology & the Margin Battle

MIX-UP OR BE SQUEEZED

In a market defined by falling prices, technology is not a feature race — it is the **margin defense**. Each transition below is a chance to step off the commodity a-Si floor onto a higher-priced tier where image quality, weight or speed commands a premium the price war cannot reach. Where a detector maker sits on these S-curves decides whether it earns 18% or 8%.

Exhibit 4 · The detector technology transitions, on the adoption S-curve

Source: Signify Research; Yole; Samsung; SNS Insider



Source: Signify Research (FPD market); Yole / Varex (IGZO); Samsung (glassless AccE); SNS Insider (photon-counting). Position = innovators → early adopters → mature.

The backbone transition is the **backplane**. Amorphous-silicon (a-Si) — ~80% of FPD share but declining — is where commoditization and ASP erosion bite hardest. **CMOS** sits at the premium end (lower noise, dynamic and small-format strength) but is capacity-constrained by wafer fabs and the mechanical tiling needed for large panels. The strategic sweet spot is **IGZO**: cost close to a-Si, performance approaching CMOS — "striking a cost-performance balance," in the industry's phrase. A maker that owns CMOS and IGZO defends margin; one stuck in a-Si runs the price war it cannot win.

The four margin-defense levers

Beyond the backplane, four product moves let a merchant maker resist the price collapse. Each is a deliberate step toward a tier where the buyer pays for performance, not just a panel:

Exhibit 5 · The margin-defense levers — and where each escapes the price war

Lever	What it is	Why it holds price	Status
Glassless / flexible	Plastic-substrate TFT, glass-free, drop- & water-tolerant	Lighter, more durable; requested in premium fixed + mobile tenders	Premium, early-growth (Konica AeroDR, Samsung AccE, Vieworks FW)
Static → dynamic / cine	High-frame-rate detectors for fluoroscopy, C-arm, DBT	"Traditionally resisted the steep price declines of static"	Mid-growth ~6.8–9%; the clearest escape from commodity
CsI / IGZO up-tech	Cesium-iodide scintillator + IGZO backplane	Higher DQE, low-dose → premium clinical positioning	Standard in premium; the cost-performance balance point
Mammography / fine-pitch	75–99 µm pitch, tomosynthesis (3D)	Resolution requirement is a barrier; DBT grows ~13.8%	Defensible premium niche

Two frontier shifts sit further out and should be watched rather than modeled. **Photon-counting** detectors — direct-conversion, no scintillator — are real but tiny (the PCD-CT market is only ~USD 0.1–0.4bn in 2025, albeit growing 29–45%) and today belong to integrated OEMs like Siemens, not merchant FPD makers; they are long-dated upside, not near-term revenue. And **printed / semiconductor-ink direct-conversion** panels (e.g. Silveray targeting sub-USD 1,000 detectors) could reset the low-end cost frontier — a structural watch-item for the commodity floor, not yet a commercial force.

> **THE TECHNOLOGY READ**
> The whole technology map reduces to one instruction for a merchant maker: **keep moving up and out of a-Si static general-radiography**. Glassless, dynamic, CMOS/IGZO and mammography are the rungs that hold price; photon-counting and printed detectors are the frontier to monitor. A company's position on these rungs *is* its margin — which is exactly how to read Vieworks next.

The value chain — and where the detector maker sits

Understanding the squeeze requires seeing where a merchant detector maker sits in the chain, and who holds the power on either side of it:

- **Upstream** — scintillator (CsI / Gadox), TFT or CMOS backplane, readout ASICs. Some makers (Vieworks, iRay, Rayence) integrate parts of this; it is the cost/yield lever.
- **The detector module (Vieworks' position)** — assembling sensor + scintillator + electronics + firmware into a calibrated, certified panel. This is where image-processing IP and reliability earn their premium — or fail to.
- **Downstream** — the system OEM (GE, Siemens, Philips, Canon, Fujifilm, Samsung, plus Korean dental/C-arm makers) that wraps the detector in a machine, software and a brand, and owns the hospital relationship.

The bargaining-power problem is structural and runs in *both* directions. Downstream, the largest OEMs increasingly **make their own detectors** — Trixell is co-owned by Siemens and Philips; Canon, Fujifilm and Konica self-supply — so the merchant's addressable market is the demand those OEMs *don't* internalize, and it is shrinking. Upstream and laterally, **vertically-integrated Chinese makers** (iRay built China's first full a-Si supply chain) compress the cost floor. The merchant detector maker is squeezed between a foreclosing customer base and an undercutting supply base — which is precisely why the premium edge is the only durable ground, and why image-quality IP, not scale, is the moat.

> **THE POSITION THAT DEFINES THE SECTOR**
>
> A merchant FPD maker captures the value of **turning silicon and scintillator into a trusted clinical image** — no more, no less. It does not own the patient relationship (the OEM does) nor, increasingly, the cheapest manufacturing (China does). Its only expandable margin is moving the image quality it delivers up-market faster than the tier below commoditizes. Hold that frame for the company section.

3 The Company Within the Market

THE PREMIUM SURVIVOR

Vieworks (founded 1999, listed on KOSDAQ 2009, headquartered in Anyang, ~250 employees) runs **three hardware franchises off one core competence** — optics plus high-resolution CMOS/TFT image sensors plus real-time image processing: X-ray flat-panel detectors (brand VIVIX, ~70% of revenue), machine-vision cameras (~20%), and an emerging digital-pathology line (brand VISQUE, ~3%). It is an exporter — ~83% of revenue is sold abroad — and an unusually R&D-heavy one, spending **10.8% of sales on R&D**, the financial signature of a company competing on image quality rather than price.

The five-year financial record — the market's reset, lived

The income statement tells the market's story in one company's numbers. Vieworks compounded revenue from ₩193.1bn (2021) to a record ₩239.3bn (2025) — but the operating margin *halved*, from ~18% to ~9%, in the 2023 reset and has not recovered to the old level. The balance sheet stayed healthy throughout (the company funds rising dividends and buybacks from cash), which is why the reset reads as a market-driven re-pricing of the product, not a failure of the business.

Exhibit 6 · Five-year consolidated record, FY2021–FY2025 (₩bn, CFS)

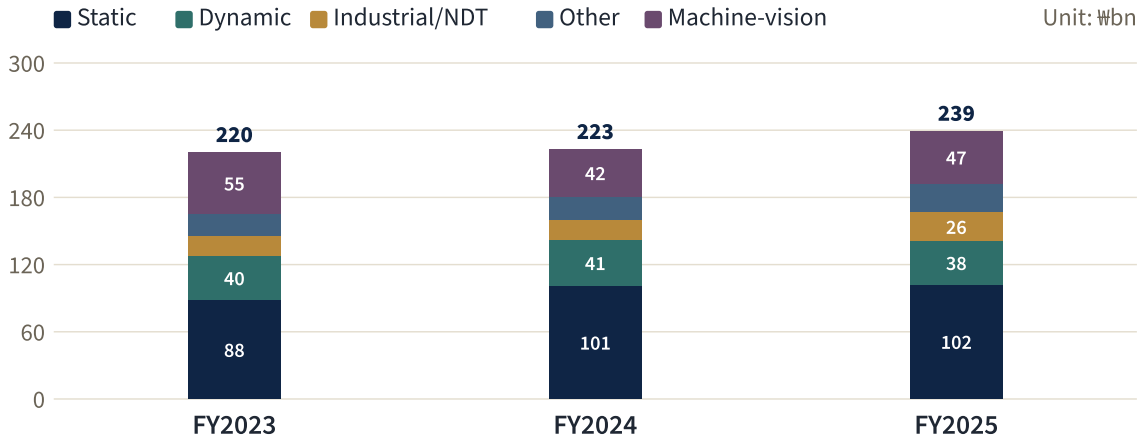
Metric (₩bn)	FY2021	FY2022	FY2023	FY2024	FY2025
Revenue	193.1	237.9	220.3	222.9	239.3
Operating profit	34.8	43.7	18.7	22.3	21.4
OP margin	**18.0%**	**18.3%**	**8.5%**	**10.0%**	**8.9%**
Net income	33.5	26.5	14.8	21.1	20.9
R&D / sales	~9%	~9%	~10%	~10%	10.8%
Detector units (000)	12.7	14.4	15.3	16.6	17.5

The unit line is the tell: detector volumes rose every single year — 12,700 to 17,500 — through the very period the margin halved. That is "rising volumes, falling prices" inside one P&L. The FY2025 margin dip to 8.9% (from 10.0%) was self-inflicted in a constructive way: the cost of new-business R&D and the digital-pathology subsidiary. The recovery signal — 1Q26 operating margin ~15.1%, the first improvement in thirteen quarters — suggests the reset is bottoming as those investments mature and demand recovers.

What it sells, and how the mix is shifting

Vieworks' revenue splits into five product lines, and the shape of the shift matters more than the snapshot. The static-detector core (VIVIX-S) is large but slow; the growth comes from the **industrial/NDT detector line (VIVIX-V), up +43.9% in FY2025**, and a recovering machine-vision camera line — exactly the high-growth edges the market section identified. The dynamic line (VIVIX-D) is the soft spot, down −6.5% on Korean-dental customers' China weakness.

Exhibit 7 · Revenue by product line, FY2023→FY2025: the industrial and machine-vision edges carry the growth



Source: DART 20260323001685, decoded sales table. FY2025: Static ₩102.5bn (42.8%), Dynamic ₩38.4bn (16.0%), Industrial/NDT ₩25.9bn (10.8%, +43.9%), Other incl. mammography/bio ₩25.4bn (10.6%), Machine-vision + golf ₩47.2bn (19.7%).

The shift is the thesis in miniature: the slow static core funds the company while the **industrial and machine-vision edges** — the high-growth pockets the market section flagged — supply the growth, and Vieworks has the product breadth to sell into each. The −6.5% dynamic dip is the one soft spot, a China-exposure question the outlook section returns to.

Where it sells — Europe-anchored, broadly exported

Vieworks is the rare Korean component maker whose largest market is **Europe (~38% of revenue)**, not its home market — a tender-driven, glassless-adopting region that rewards exactly its premium tilt. Korea is ~17–22% and softening; North America (~18%), China and Japan are the swing regions, all growing double-digit year-on-year in early 2026 (China +40%, Japan +26%, North America +14%).

Exhibit 8 · FY2025 revenue by geography — Europe-anchored, broadly exported (approximate)

Source: NRG estimate from DART geographic disclosure + broker commentary (LS/Eugene); Europe ~38% and Korea ~22% are reported, the remainder apportioned. 1Q26 YoY growth shown per region.

That ~83% export ratio is both the growth engine and a structural exposure. It makes Vieworks a beneficiary of a weak won and a casualty of a strong one — and, as the market section flagged, it places the company on the wrong side of the **tariff and localization shift** (US tariffs ~15% on Korea; India/Indonesia local-content rules) that rewards locally-built supply. For Vieworks, geography is a cost-of-access variable as much as a demand one.

The product platform — VIVIX detectors

Vieworks' detector portfolio is the concrete expression of the "mix-up" strategy: a breadth of substrates, scintillators and frame rates that lets it sell into every premium pocket the market section identified. The platform is unusually wide for a maker of its scale.

Exhibit 9 · The VIVIX detector platform — and how each line maps to a premium lever

Line	What it is	FY25 rev	Premium lever it plays
VIVIX-S (static)	General-radiography FPDs; a-Si + **flexible glass-free "FW"** (99 µm, 1.5m drop-tolerant, waterproof), CsI; "Inside AP" built-in Wi-Fi	₩102.5bn	Glassless / substrate breadth
VIVIX-D (dynamic)	Cine detectors for dental CBCT, surgical C-arm, fluoroscopy; **IGZO TFT, 50–400 fps**; Noise-X Live AI denoising	₩38.4bn	Static→dynamic; IGZO up-tech
VIVIX-C (CMOS)	CMOS line-scan / slot detector for dental pano & CBCT — sharper image at lower dose	(in S/other)	CMOS / dose efficiency
VIVIX-M (mammo)	75 µm CsI; the **2430D does 3D tomosynthesis (DBT)**	(in Other)	Fine-pitch / DBT (~13.8% mkt)
VIVIX-V (industrial)	**NDT/industrial: bendable, portable, dynamic; IGZO high-speed; pipe/weld, battery, security, industrial CT**	**₩25.9bn**	**Industrial edge (+43.9% FY25)**

The differentiators are real and image-quality-led, not price-led: **flexible glass-free panels** with a wider substrate menu than most pure-play rivals; the **"Inside AP"** built-in wireless access point (a Wi-Fi base station inside the panel, with on-board buffering); **IGZO dynamic detectors** hitting 400 fps panoramic over 10GbE; and FDA-cleared image-processing/AI software (VXvue, Bone-X, Noise-X). This is the toolkit of a company built to hold price on quality — the strategically correct posture for the market it is in.

The second leg — machine-vision cameras

~20% of revenue and the structural growth offset to a maturing detector core, Vieworks' machine-vision line leverages the same sensor/optics competence into industrial inspection. It plays at the **highest-resolution, specialty end** — single-sensor area-scan to 245 MP (VC), pixel-shift to 1,152 MP (VNP, a vendor "world's highest resolution" claim), and hybrid **TDI line-scan (VT/VTS, up to 16K, BSI "VT Sense")** that won "World Class Product of Korea" in 2025. Its proprietary large-area "Syncron" sensor brand is a degree of vertical integration few camera vendors have.

The target verticals are the steep edges of the market: **display/FPD inspection, secondary-battery (EV) inspection** (Vieworks holds US patents on battery appearance-inspection apparatus), and **semiconductor / advanced-packaging inspection** — where AI-driven HBM/packaging capex is the new tailwind and Vieworks cameras have been adopted by global semiconductor-equipment OEMs. The line is more cyclical than medical (it tracks customers' capex; a golf-simulator camera sub-line fell ~23% from its 2024 peak and is expected to re-expand on export from H2-2026), but it is where the highest CAGRs live. The competitive set here is different and larger — Teledyne DALSA (~19× Vieworks' total revenue, the TDI benchmark), Basler, Hamamatsu — and Vieworks competes on resolution and specialty, not scale.

The third leg — digital pathology (the option)

The newest franchise, **VISQUE DPS** whole-slide scanners (LH510, LH210), extends the same optics/sensor base into digitizing pathology slides — a structurally attractive, AI-adjacent adjacency. It carries a Korea MFDS licence and a **CE IVDR mark (LH510, April 2025)**, with the LH210 debuting at USCAP 2026 in the US. Two caveats keep it firmly in the "option" column: there is **no FDA clearance** for the scanner and **no disclosed standalone revenue** (it sits inside the ~₩6.2bn "Other" bucket and is currently a margin drag), and the incumbents (Leica/Aperio, Hamamatsu, Philips, Roche, 3DHistech) are entrenched. It is genuine upside optionality on the same competence — to be sized as zero in a base case and as a swing factor in a bull case.

The engine room — R&D, capacity, capital discipline

Three operating facts complete the company picture and explain how it survived the market reset better than its peers:

- **R&D intensity of 10.8% of sales** (₩25.9bn in FY2025) — exceptionally high for a hardware component maker, and the direct funding of the premium/technology ladder (IGZO dynamic, glassless, mammography DBT, digital pathology). It is also part of why the FY2025 margin dipped — investment, not weakness.
- **Capacity ahead of demand** — a Hwaseong site expansion **doubled flagship-detector capacity in November 2025**, positioning the company for the volume recovery without fresh capex drag in the forecast period.
- **Capital discipline signalling confidence** — a rising dividend (DPS ₩350→₩600→₩690, 2023→2025), treasury-share cancellations, and a ₩10bn buyback in March 2026. Read as business strategy, not an investment signal: a cash-generative niche business returning capital while it re-bases margins.

> **THE COMPANY, PLACED**
> Vieworks is the textbook "right strategy" for this market: an R&D-heavy, premium-tilted, export-led merchant detector maker that climbed up the technology ladder (CMOS, IGZO, glassless, mammography) and out into industrial inspection — and held profitability through a price reset that pushed its domestic peers into losses. The remaining question is entirely competitive: can it keep climbing faster than the market squeezes? That is the next section.

4 Competitive Landscape & Position

SQUEEZED ON TWO FLANKS

The detector market has **two different competitive pictures**, and the difference is the whole story. Measured as OEM/systems components, the incumbents dominate — Varex ~22%, Trixell ~18%, Canon ~15%, Carestream ~14%, Fujifilm ~12% (top-5 ≈ 81%). But measured as the **merchant FPD** market — detectors sold to integrators rather than self-supplied — the Asian cost players (iRay, Vieworks, Rayence, DRTECH, CareRay) have taken material share, and the leader by that measure is Trixell, with iRay now a clear top-three. Vieworks lives in the merchant basket, so that is the one to read.

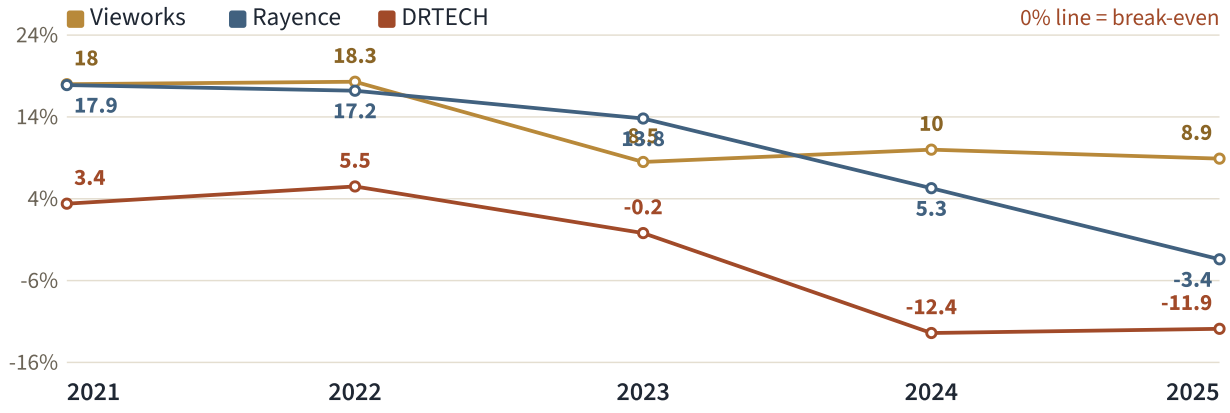
The global field, by role

- **Varex Imaging** (NASDAQ: VREX) — the pure-play merchant leader, FY2025 revenue **US$845m** (detectors + X-ray tubes), ~5× Vieworks. The default supplier the Korean players take share from; out-scopes Vieworks (tubes, CT, security) but competes head-on in premium DR and industrial.
- **Trixell** (France) — private JV owned by Thales/Philips/Siemens; the **#1 medical-FPD share (>18%)**, dominant in Europe and dynamic/cardio. Because Siemens and Philips co-own it, it **forecloses** a large slice of OEM demand to merchants.
- **Canon, Fujifilm, Konica** — conglomerate OEMs that both self-supply their own systems *and* sell merchant modules; dual threats that shrink the merchant pool while competing in it.
- **iRay Group** (Shanghai STAR: 688301) — the disruptor (see overleaf): ~US$313m, ~28% net margin, vertically integrated, climbing the technology ladder.
- **Teledyne DALSA, Basler, Hamamatsu** — the machine-vision rivals on the industrial leg; far larger, competed on the high-resolution specialty edge.

The Korean trio — and the survivor read

The most revealing competitive evidence sits in Vieworks' own backyard. Korea has three listed detector makers — Vieworks, **Rayence** (a Vatech-group component arm, strong in dental/CMOS) and **DRTECH** (an independent, Korea's first DR-detector developer) — and all three rode the same ~18% golden era into the same 2023–2025 reset. But only one stayed profitable.

Exhibit 10 · The survivor chart: Korean detector-trio operating margin, 2021→2025



Source: DART consolidated CFS — Vieworks (100120) 20260323001685, Rayence (228850) 20260316001022, DRTECH (214680) 20260320001313. The 0% line is break-even; Rayence fell to −3.4% and DRTECH to −11.9% in FY2025, while Vieworks held ~8.9%.

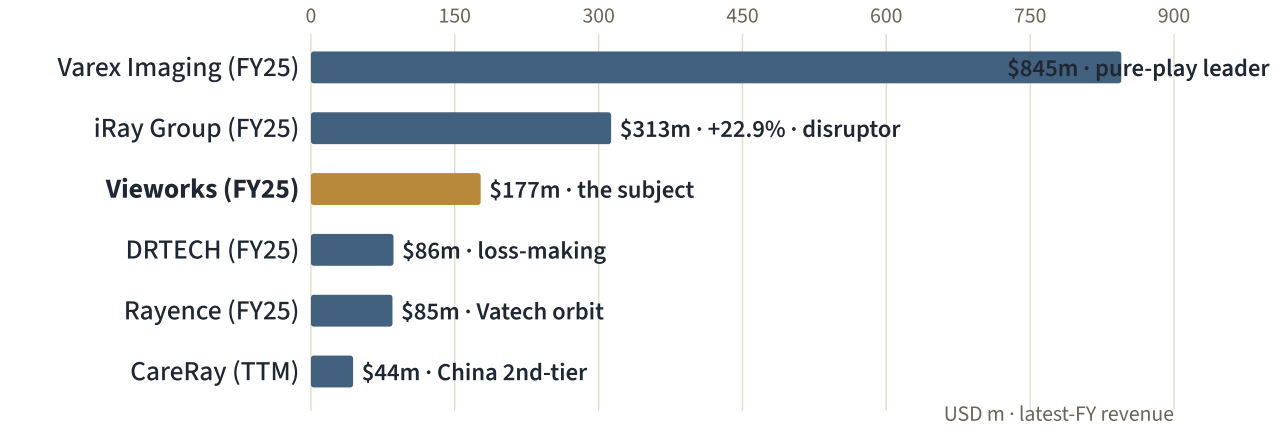
The divergence is the thesis in one picture. Rayence collapsed from ~18% to a **−3.4% loss** as its revenue shrank from ₩147bn to ₩115bn; DRTECH chased revenue growth (to ₩116bn) straight into a **−11.9% loss**. Vieworks, with the richest premium and industrial mix of the three, absorbed the same price shock and stayed at **~8.9%** on a *rising* revenue base. The lesson generalizes: in a "volumes-up, prices-down" market, the maker with the best mix — not the most volume — is the one that survives the reset. Vieworks is the demonstration case.

> **WHY THE KOREAN TRIO IS THE CLEANEST EVIDENCE**
>
> Three companies, one country, one cost base, one currency, one market shock — the only variable that differs is **product mix and premium positioning**. That Vieworks alone stayed profitable isolates mix as the survival factor better than any cross-border comparison could. It is the empirical core of the "premium edge is the only defensible ground" thesis.

iRay — the disruptor that changes the math

The single most important competitive development is the rise of **iRay**, China's #1 detector maker. Over five years its revenue compounded from ~US$165m (2021) to ~US$313m (2025) at a ~28% net margin, on a highly automated, vertically-integrated, aggressively-priced model — and it now spans a-Si, IGZO, CMOS, dynamic, mammography, dental and security, a broader range than Vieworks. Critically, iRay has **passed Vieworks on detector revenue scale** (~1.5× its medical-detector revenue) and is climbing from the commodity floor into the premium tiers Vieworks depends on.

Exhibit 11 · Merchant detector revenue scale, latest FY (USD m): Vieworks mid-pack, behind a rising iRay



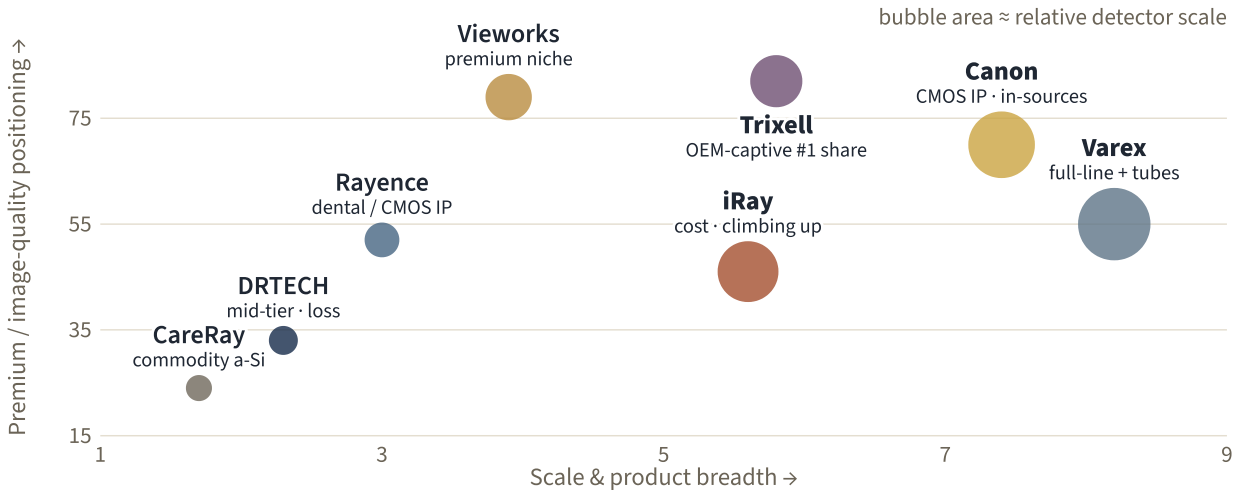
Sources: Varex FY25 release ($845m); iRay (stockanalysis.com, 688301) FY25 ~$313m; Vieworks FY25 DART (₩239.3bn ≈ $177m total); DRTECH / Rayence FY25 DART; CareRay PitchBook TTM. Conglomerate OEMs (Canon ~$29bn, Fujifilm ~$21bn) excluded for scale; Trixell #1-by-share but private. FX ₩1,350/$.

The scale chart reframes Vieworks' position honestly. It is a **mid-tier merchant specialist** — comfortably ahead of the other Korean and Chinese cost players (DRTECH, Rayence, CareRay), but now behind Varex and iRay on revenue. Its defense is not scale, which it has lost to iRay, but the **premium/specialty mix** the survivor chart already proved is decisive. The strategic imperative the landscape dictates is therefore stark: keep climbing the premium and technology ladder fast enough to stay above iRay's ascent, because competing on price against Chinese a-Si is structurally unwinnable.

Positioning — premium tilt, mid scale

Mapping the field on two axes — scale & product breadth against premium/image-quality positioning — locates Vieworks precisely: **high on premium, mid on scale**, in the same upper band as Trixell and Canon but without their captive-OEM volume, and clearly above the commodity cluster (DRTECH, CareRay) that competes on price.

Exhibit 12 · Positioning map: scale & breadth (x) versus premium / image-quality tilt (y)



NRG positioning synthesis from §4 profiles. Vertical axis = premium/image-quality tilt (CMOS, mammography, glassless, dynamic); horizontal = revenue scale & product breadth. Bubble area ≈ relative detector scale. Illustrative, not to scale.

The map makes the two-flank squeeze visual. From the **lower-left**, iRay and CareRay press upward on price, migrating up as they add IGZO/CMOS; from the **upper-right**, Trixell and Canon foreclose OEM demand. Vieworks' defensible territory is the **upper-middle** — premium quality at merchant scale — which it must keep defending with R&D as both flanks move toward it.

Estimated share — read it by basket

Share must be stated by basket to avoid the scope trap. Trade sources call Vieworks a "Global Top 3" / "#1 DR-panel" maker, but that is strongest in **portable/retrofit DR** specifically. The defensible synthesis: **~10–12% of the merchant flat-panel-detector market** (a named top-5 FPD player), but only a **low-single-digit %** of the all-in detector market. By sub-segment: strongest in mammography (glass-free, 99 µm) and portable/retrofit DR; trailing in dynamic (behind Trixell) and dental (contested by Rayence and iRay).

The three competitive threats, ranked

The landscape resolves into three threats a strategy client should weigh, in order of structural severity:

Exhibit 13 · Competitive threat assessment

Threat	Severity	Mechanism	Vieworks' defense
Chinese cost (iRay/CareRay)	High	**Vertically-integrated, ~28%-margin supply compressing ASPs; iRay passed Vieworks on scale and is climbing into premium**	**Stay ahead on CMOS/IGZO/glassless/dynamic image quality; cannot win on price**
OEM in-sourcing / captive JV	High	**Trixell (Siemens/Philips), Canon, Fuji, Konica self-supply — forecloses merchant demand**	**Serve the integrators OEMs don't internalize (dental, C-arm, regional, industrial)**
Technology leapfrog	Med	CMOS/IGZO/glassless become table-stakes; photon-counting + printed-ink reset the frontier	10.8% R&D intensity; pioneered glassless; monitor PCD/printed
Tariffs / localization	Med	US tariffs ~15% on Korea; India PLI / Indonesia local-content reward local build	Korea-centric exporter exposed; a structural cost-of-access headwind

THE NET COMPETITIVE READ

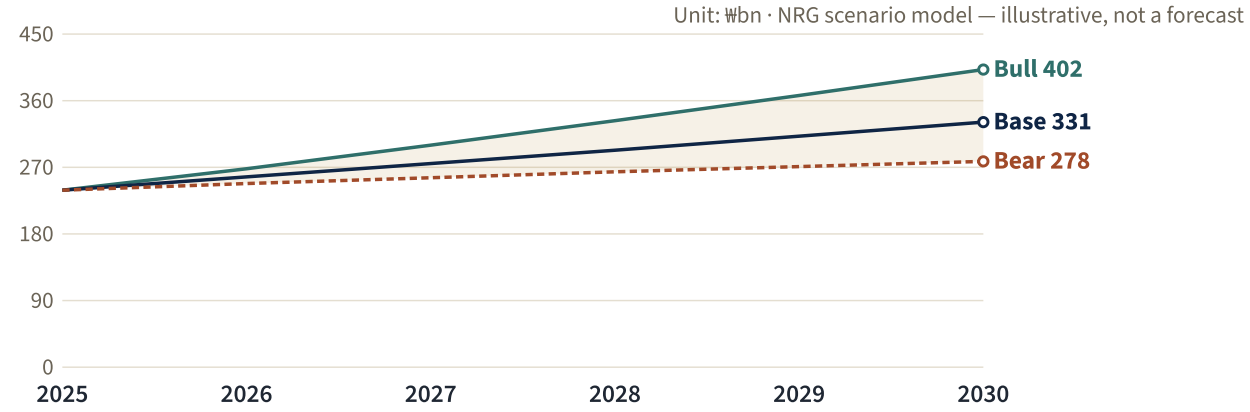
Vieworks is squeezed on **two flanks** — from below by Chinese cost (iRay/CareRay) and from the side by OEM captive supply (Trixell/Canon/Fuji/Konica) — while a third front (CMOS/IGZO/glassless/photon-counting/printed) keeps moving. Its defensible ground is the premium FPD niche and the hybrid-TDI camera franchise, both image-quality-led and R&D-intensive. The strategic imperative is to keep climbing the premium/technology ladder fast enough to stay ahead of iRay's ascent — the survivor chart shows it has done so far, but the margin of safety is the open question.

5 Forward Outlook 2026–2030

THREE PATHS

The forward view turns on whether Vieworks' two escape routes — **up** the premium/technology ladder and **out** into industrial inspection and digital pathology — compound faster than the medical core matures and ASPs erode. The scenarios below are **illustrative analytical constructs on a market basis — not forecasts of record, and explicitly not a valuation**. They are anchored to the two brokers' published segment forecasts (LS Securities to FY2028, Eugene to FY2027) and extrapolated on segment CAGRs.

Exhibit 14 · Revenue scenarios 2025–2030 (₩bn): base ~6.7% CAGR tracks the market; the bull needs a new leg to inflect



NRG scenario model, illustrative. Anchored to LS Securities (FY26 ₩254bn / FY27 ₩270bn / FY28 ₩285bn) and Eugene (FY26 ₩261bn / FY27 ₩288bn); 2029–30 extrapolated on segment CAGRs. Not a forecast; not a valuation.

The base case (~₩331bn by 2030, ~6.7% CAGR) is the market-consensus shape: static DR grows low-single-digit on emerging-market volume offsetting NA/EU price erosion, industrial/NDT continues its share gain, machine-vision compounds ~10–13% on battery and semiconductor inspection, and digital pathology contributes only a thin, rising slice. Operating margin normalizes to ~13–15% (per the 1Q26 recovery). The bull and bear diverge on whether a *new growth leg inflects* — and that is entirely about the swing factors overleaf.

The three paths, with explicit assumptions

Bull

~₩402bn by 2030

~11% CAGR. Assumes three engines fire together: machine vision >15%/yr as battery + semiconductor/advanced-packaging inspection scale and Vieworks wins semiconductor-equipment design-ins; digital pathology crosses from margin-drag to a visible revenue line (CE-IVDR Europe + USCAP-2026 US entry); and NA/EU medical recovery sustains. OPM toward 16–18%. *Needs at least one of {DP, semiconductor MV} to inflect.*

Base

~₩331bn by 2030

~6.7% CAGR. Assumes the broker-consensus shape: static DR low-single-digit on EM volume vs NA/EU ASP erosion; dynamic flat-to-up; industrial/NDT mid-high-single-digit share gain; machine vision ~10–13% on battery + semiconductor with a golf-simulator cyclical recovery; DP a thin slice. OPM normalizes 13–15%. *No new leg inflects; steady share gains.*

Bear

~₩278bn by 2030

~3.0% CAGR. Assumes static DR ASP erosion outpaces unit growth; dynamic stays depressed (Korean-dental-to-China weakness persists); machine vision stalls on a display-capex air-pocket + delayed battery/semiconductor capex; digital pathology stays sub-scale (no FDA, incumbent lock-in). Growth collapses to roughly the underlying FPD market rate. *MV cyclicality bites; no new leg.*

The asymmetry worth noting: the **base and bull share the same medical core** and differ almost entirely on the *industrial and optionality legs*. That is the structurally correct place for the upside to sit — on the high-CAGR edges the market section identified — and it means the forward question is less "will medical recover" (it is recovering) than "will the second and third legs scale." The swing factors below decide it.

The four swing factors that decide the path

Four variables, in order of how much they move the model, separate the scenarios. A client tracking Vieworks or the sector should monitor these directly:

1. **Machine-vision demand (the biggest swing).** Secondary-battery X-ray inspection (~15% market) and semiconductor/advanced-packaging inspection (AI-capex) are the high-CAGR pulls; display/OLED capex is the drag; the golf-simulator sub-line is the cyclical wildcard (export rebound expected H2-2026). At ~20% of revenue but the highest beta, machine vision swings the model most.
2. **Digital-pathology commercialization (the optionality leg).** Whether VISQUE DPS crosses from a margin-draining R&D project into a visible revenue line — gated by the lack of FDA clearance and entrenched incumbents (Leica, Philips, Roche, Hamamatsu), with speed/dual-application/AI-readiness/price as the wedges. Its absence defines the bear; its success defines the bull.
3. **North America & Europe recovery + emerging-market DR penetration.** The static-DR core's trajectory hinges on the NA/EU cyclical recovery already visible in 1Q26 (NA +14%, EU +10% YoY) holding, plus continued analog→digital replacement in LatAm, MEA, SE Asia and India, where Vieworks' cost-competitive exports win on volume.
4. **Dynamic-detector mix + China exposure.** The dynamic line de-grew in FY2025 on Korean-dental customers' China softness. Recovery depends on IGZO high-fps detectors capturing C-arm intensifier replacement and European dental-CT wins, and on China demand stabilizing (1Q26 China +40% YoY is encouraging but volatile).

> **THE FORWARD READ**
>
> The most likely 2026–2030 path is the **base case**: a cyclical medical recovery, steady industrial/NDT share gains, machine-vision compounding on battery and semiconductor inspection, and a margin normalizing back toward the mid-teens — i.e., the reset reversing without a structural breakout. The breakout to the bull case is real but **conditional on a second or third leg inflecting**, most plausibly semiconductor-driven machine vision or digital pathology. The bear requires the machine-vision cycle to stall *and* no new leg to contribute.

6 Strategic Implications

HOW THE MARKET READS

For a consulting client mapping the medical- and industrial-imaging sector, Vieworks is most useful not as a single name but as a **clean read on how a maturing component market sorts its players** — and as a specific position within it. Five implications follow.

- **The market sorts on mix, not scale.** The Korean trio is the proof: same cost base, same shock, and the maker with the best premium/industrial mix (Vieworks) stayed profitable while volume-chasers (DRTECH) and shrinking incumbents (Rayence) fell into losses. Any thesis in this sector should be a thesis about mix.
- **The growth is at the edges and in industrial.** Medical general radiography is a ~3% market; the value is in DBT mammography, dental/CBCT, and — above all — industrial inspection (battery ~15%, semiconductor AI-capex). A maker's exposure to those edges is its growth.
- **China is the structural variable.** iRay's ascent — past Vieworks on scale, climbing into premium — is the single most important sector development. The question for every merchant maker is whether its premium moat widens faster than iRay closes it.
- **OEM in-sourcing caps the merchant TAM.** The addressable merchant market is what the captive OEMs (Trixell/Canon/Fuji/Konica) don't internalize, and it narrows over time — pushing merchants toward the segments OEMs don't want (dental, C-arm, regional, industrial, retrofit).
- **Vieworks is the premium survivor with two call options.** Its base case is a steady ~6–7% compounder re-basing margins upward; its upside is conditional on machine-vision (semiconductor) or digital pathology inflecting. That is the shape of the opportunity — and the uncertainty — to price.

> **The open questions a market study leaves — and primary research can close.** Three things filings and market reports cannot resolve: the real durability of Vieworks' OEM/ODM detector relationships (customer names are undisclosed); how fast iRay is actually winning premium and dynamic sockets at Vieworks' expense; and whether digital pathology has a credible path past the FDA gap and the incumbents. Each is decidable with the right primary voices — which is where Nathan Research works.

Working With Nathan Research

COMPLIANT EXPERT NETWORK

Market reports and filings establish the *shape* of this sector; they do not capture the operating detail that decides a strategy — the real state of OEM detector allocation, how fast iRay is taking premium sockets, the texture of the digital-pathology launch. That detail lives with the people who built, sold, specified, sourced and competed with these products — and reaching them, compliantly, is what Nathan Research does.

Nathan Research Group operates **Korea's first dedicated expert-network service, established in 2013**. We were built for the global private-equity, hedge-fund or corporate-strategy team that has a thesis on a Korean or Asian asset and needs primary, on-the-ground diligence that public disclosure cannot supply. The medical-device, X-ray-imaging and machine-vision complex is one of our deepest benches.

Who we put in the room

For a Vieworks or X-ray-detector / medical-imaging engagement, we source, vet and convene primary experts across the value chain:

- **Former executives & engineers** — from Vieworks and its peers (Rayence, DRTECH, Varex, iRay-adjacent)
- **Detector & sensor specialists** — a-Si/IGZO/CMOS backplane, scintillator, glassless and dynamic-FPD design
- **Imaging-system OEM buyers** — detector sourcing, qualification and vendor-allocation specialists
- **Machine-vision & inspection experts** — battery, semiconductor/advanced-packaging and display inspection
- **Digital-pathology & lab contacts** — adoption, regulatory (CE-IVDR / FDA) and incumbent-displacement views
- **China-market & channel specialists** — the iRay/CareRay cost dynamic and localization/tariff effects

How an engagement works

1 · Scope

We translate your thesis into a precise expert profile and question set, mapped to the decisions you need to make.

2 · Source & vet

We identify, screen and compliance-clear each expert — confirming relevance, recency and the absence of conflicts before any call.

3 · Convene & synthesize

We arrange interviews on your timeline and, where useful, deliver written synthesis tied back to the questions in this brief.

Partner With Nathan Research

START THE CONVERSATION

If your team is evaluating **Vieworks**, the **X-ray-detector and digital-imaging sector**, or the broader **medical-device and machine-vision supply chain** in Korea and Asia, we would welcome the conversation. Tell us the decision you are trying to make — we will tell you, candidly, whether and how our network can help you make it.

What to expect when you reach out: A direct reply from a partner, not an intake form — and a scoping conversation rather than a sales call. From there: a compliant, conflict-cleared expert panel assembled to your timeline, and, where useful, written synthesis that builds directly on the analysis in this monograph.

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A Appendix

SOURCES · METHODOLOGY · GLOSSARY

Evidence base & methodology

This monograph synthesizes primary and secondary sources, cross-checked on 2026-06-17. Figures are cited inline; where houses disagreed (notably detector sizing, which differs up to ~5× on scope), **ranges are presented with attribution**. "NRG estimate" items are analyst derivations from sourced figures plus Vieworks' disclosed mix.

Regulatory (DART, primary): Vieworks Annual Report FY2025 (rcept **20260323001685**) + 7-yr structured consolidated financials (fnlttSinglAcntAll CFS, 2019–2025) and the decoded segment sales table; Q1-2026 quarterly report. Peer annual reports: **DRTECH** (214680, rcept 20260320001313) and **Rayence** (228850, rcept 20260316001022), used for the Korean-trio margin comparison.

Market (KRX): by_company/vieworks 1-yr panel — used here only as a contextual demand overlay, never as a valuation or price input (consistent with the market-research framing).

Sell-side (as market forecasts only): LS Securities (rcept-linked notes 649050 / 644511) and Eugene Investment (649002 / 646928) — used strictly for segment revenue forecasts; **all rating, target-price and valuation content was stripped** and is not reproduced.

Web market research (adversarially verified): detector, digital-X-ray-system, DR, mammography/DBT, dental/CBCT, veterinary, machine-vision-camera, TDI line-scan and battery/semiconductor X-ray-inspection sizing from Mordor Intelligence, Signify Research, GM Insights, MarketsandMarkets, Grand View, Fortune Business Insights, Research and Markets, SkyQuest, SNS Insider, Precedence, Valuates and others — each headline figure cross-checked; single-source or contradicted figures presented as ranges.

Competitors: Varex FY24/FY25 releases; iRay revenue history (688301, stockanalysis.com); Canon / Fujifilm / Konica Minolta / Teledyne / Basler financial releases; Trixell (private, share via Signify / diagnosticimaging); Vieworks/peer figures from DART and Korean trade press.

Data notes: (1) Vieworks' DART segment cut differs from the broker product-line decode in Exhibit 7; both are internally consistent (see §3). (2) Exhibit 8 geography is an NRG estimate (Europe ~38%, Korea ~22% reported). (3) Digital pathology has no disclosed revenue and no FDA clearance — sized as optionality only. (4) "Top 3 / #1 DR-panel" are trade claims, strongest in portable/retrofit DR. (5) Rayence is a Vatech-group subsidiary (not Osstem).

Glossary

FPD — flat-panel (X-ray) detector. **DR / CR** — digital radiography / computed radiography (the older cassette tech being replaced). **a-Si / IGZO / CMOS** — detector backplane technologies. **CsI / GOS** — scintillator materials. **DQE** — detective quantum efficiency. **DBT** — digital breast tomosynthesis (3D mammography). **CBCT** — cone-beam CT (dental). **TDI** — time-delay-integration (high-speed line-scan). **NDT** — non-destructive testing. **OEM / ODM** — original-equipment / original-design manufacturer. **ASP / OPM** — average selling price / operating margin. **DART** — Korea's disclosure system; **rcept_no** — filing receipt number. 정지영상 디텍터 (jeongji-yeongsang) — static detector. 동영상 디텍터 (dong-yeongsang) — dynamic/cine detector. 사업보고서 (saeop bogoseo) — Annual Report.

> **SCOPE & DISCLAIMER**
>
> This is a market-research and business-analysis document for sector and competitive analysis; it is **not** investment advice and contains no price target or valuation. Sell-side numbers are third-party market forecasts; forward scenarios are illustrative constructs, not forecasts of record. Prepared by Nathan Research Group, Seoul, 2026-06-17.