

NEXT-GENERATION NON-INVASIVE CGM ARCHITECTURE

Strategic Patent Transfer, Turnkey Technology Acquisition & Joint Venture Co-Development Proposal for a Revolutionary Microfluidic & Multi-Modal Wearable Glucose Monitoring Ecosystem.

PATENT DISCLOSURE & JOINT VENTURE COMMERCIALIZATION BRIEF (2026)

PROPRIETARY TECHNOLOGY HOLDING ENTITY

Tink Innovation

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INTELLECTUAL PROPERTY STATUS

**Republic of Korea Patent Filed (Pending)
PCT International Filing in Active Preparation**

ENGAGEMENT MODELS PROPOSED

- 1) Outright Patent Transfer / Asset Assignment**
- 2) Global Joint Venture (JV) Co-Development**

Executive Summary & Investment Thesis

A high-conviction patent asset redefining continuous diabetes and metabolic monitoring

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100% NEEDLE-FREE SENSING	< 10% TARGET CLINICAL MARD	2-Track ASSIGNMENT OR JV MODEL
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1.1 Executive Overview: The Paradigm Shift in Glycemic Monitoring

Continuous Glucose Monitoring (CGM) represents the gold standard in diabetes management. However, existing market leaders (Dexcom, Abbott FreeStyle Libre, Medtronic) remain fundamentally tethered to **invasive or semi-invasive subcutaneous filament needles**. These entail physical trauma, regular insertion pain, infection vulnerability, high ongoing consumable expenses (\$1,500–\$3,500/year per patient), and severe user drop-off among pre-diabetic and lifestyle wellness demographics.

Tink Innovation has developed and filed a breakthrough architectural patent for a **Non-Invasive Continuous Glucose Monitoring (NI-CGM) Wearable Patch System**. By harmonizing *polarity-reversing reverse iontophoresis (RI)*, *capillary microfluidic routing*, *piezoelectric ultrasonic anti-fouling*, and *multimodal optical/electrochemical background subtraction*, this architecture overcomes every classical failure point of past transdermal extraction devices.

1.2 Intellectual Property Status & Stage

- **Jurisdiction:** Republic of Korea (Korean Intellectual Property Office - KIPO).
- **Application Status:** Official Patent Application Filed (Formal Specification, 13 Claims & 8 Detailed Drawings submitted).
- **International Coverage:** PCT (Patent Cooperation Treaty) application in active preparation, preserving priority rights for entry into the United States (USPTO), European Union (EPO), China (CNIPA), and Japan (JPO).
- **Current Maturity (TRL 2/3):** The invention is fully articulated at the design and architectural blueprint level. *In line with transparent disclosure, physical benchtop fabrication and clinical in vivo datasets are currently undeveloped*, representing an exceptional ground-floor opportunity for partner-driven customization and IP capture.

1.3 Proposed Collaboration Tracks

- Tink Innovation is actively seeking a strategic corporate partner, medical device conglomerate, or venture consortium to execute one of two transaction frameworks:
- **Track A: Outright Patent Acquisition & Transfer**
Full assignment of patent rights, including priority rights for PCT international filings, transferring 100% ownership and proprietary control to the acquiring entity.
 - **Track B: Strategic Joint Venture (JV) & Co-Development**
Formation of a dedicated commercialization vehicle (NewCo) where Tink Innovation contributes the core IP, architecture, and domestic ecosystem connections, while the partner funds microfabrication, clinical trials, and global regulatory clearance.

1.4 Strategic Rationale for Tier-1 MedTech & Wearable Giants

Global wearable technology leaders (Apple, Samsung, Google/Fitbit) and diabetes giants (Abbott, Dexcom, Roche) have spent hundreds of millions seeking the "Holy Grail" of needle-free glucose sensing. Previous transdermal efforts stalled due to biofouling, perspiration contamination, and skin irritation. Tink Innovation's patent delivers a legally protected, multi-layered engineering solution specifically tailored to resolve these exact bottlenecks.

Global CGM Market Landscape & Unmet Needs

Targeting a \$25B+ market expanding from clinical diabetes to 500M+ prediabetic consumers

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2.1 Macro Industry Dynamics: The Explosion of Metabolic Health

The International Diabetes Federation (IDF) estimates that over **537 million adults** are currently living with diabetes, projected to surge to 783 million by 2045. Concurrently, over 541 million people exhibit impaired glucose tolerance (prediabetes). The global continuous glucose monitoring market—valued at \$11.2B in 2025—is expanding at a CAGR of 13.8%, anticipated to exceed **\$28.5B by 2033**. Non-invasive technology is uniquely poised to unlock the mass consumer wellness and prediabetic segments where needles are clinically and commercially unviable.

2.2 Comprehensive Technology Comparison Matrix

Dimension	Finger-Prick (SMBG)	Subcutaneous CGM (Dexcom/Abbott)	Tink Innovation NI-CGM
Pain & Invasiveness	High pain; continuous capillary skin puncture; calluses and nerve trauma.	Moderate pain; 5–8mm spring-loaded needle inserted under the skin.	100% Painless; needle-free transdermal extraction via micro-current.
Infection & Trauma	Frequent open wounds; risk of infection; capillary scarring.	Bleeding, subcutaneous bruising, severe adhesive skin erythema, dermatitis.	Zero infection risk; biocompatible PDMS/PI flexible substrate.
Measurement Continuity	Discontinuous snapshots (3–7 times daily); misses nocturnal hypoglycemic episodes.	Continuous (reading every 1–5 minutes); 10 to 14-day wear lifecycle.	Continuous real-time streaming to smartwatch & phone 24/7/365.
Consumables Cost	High test-strip recurring costs (\$50–\$120/month); significant landfill waste.	High sensor replacement costs (\$150–\$350/month); expensive biohazardous waste.	Ultra-low-cost replaceable fluidic layer; semi-permanent transceiver.
Consumer Accessibility	Restricted primarily to diagnosed Type 1 and Type 2 diabetics.	Limited consumer adoption due to needle phobia and high prescription cost.	High mass-market adoption for diabetes, prediabetes, and sports fitness.
Historical RI Flaws Solved	N/A	N/A	Solves GlucoWatch flaws: No skin burns, no sweat dilution, no biofouling.

2.3 The Historical "GlucoWatch" Bottlenecks

In the early 2000s, the FDA approved the Cygnus GlucoWatch, proving reverse iontophoresis (RI) transdermal glucose extraction was clinically viable. However, it failed commercially due to four fatal flaws:

- **Continuous Unidirectional Current:** Caused severe erythema, localized blisters, and extreme skin pH imbalance.
- **Perspiration & Cosmetic Contamination:** Sweat salts and epidermal debris diluted interstitial fluid (ISF), ruining accuracy.
- **Severe Biofouling:** Protein accumulation rapidly fouled the bare electrochemical sensing electrodes.
- **Fluid Evaporation:** Micro-scale extracted ISF evaporated into ambient air before sensor detection.

2.4 The Tink Innovation Structural Solution

Tink Innovation's patent specifically resolves each historical failure point through an integrated, multi-system architecture:

- **Periodic Polarity Reversal:** Inverting current polarity every 3–10 min restores skin pH and cancels electrode polarization.
- **Hermetic Seal & Micro-Porous Filter:** PDMS substrate isolates skin; 50nm membrane blocks sweat proteins and cosmetic debris.
- **Ultrasonic Piezoelectric Self-Cleaning:** Acoustic micro-streaming physically strips bio-fouling and back-flushes debris.
- **Capillary & Electrostatic Microfluidics:** Hermetic channels suck ISF immediately, eliminating air evaporation.

Extraction Subsystem & Microfluidic Architecture

Detailed breakdown of Claims 1–5: Hermetic adhesion, electroosmosis, and directional fluidics

3.1 System Overview: The Four-Pillar Hardware Stack

The patent specification discloses an integrated wearable patch adhering to the epidermal stratum corneum, incorporating four interdependent physical subsystems: (1) **Flexible Sticky Substrate**, (2) **Reverse Iontophoresis (RI) Bipolar Electrodes**, (3) **Microfluidic Capillary Routing Layer**, and (4) **Multi-Modal Bio-Sensor Module** with Piezoelectric Actuation.

3.2 Flexible Sticky Substrate (PDMS / PI)

PATENT REFERENCE: FIG. 1 & CLAIM 1

- **Zero-Lift Anatomical Conformance:** Fabricated from medical-grade polydimethylsiloxane (PDMS) or flexible polyimide (PI) engineered to match the skin's micro-relief and dynamic curvature, completely eliminating delamination during movement.
- **Hermetic Environmental Isolation:** Creates an airtight perimeter barrier around the extraction zone. This dual-action seal prevents volatile evaporation of minute ISF droplets and physically blocks ambient contaminants (dust, perspiration, and sebum).
- **Motion Artifact Suppression:** Prevents physical displacement of electrodes relative to the skin, stabilizing skin-electrode contact impedance and preventing transient motion voltage spikes.

3.3 Reverse Iontophoresis (RI) Electrode Pair

PATENT REFERENCE: FIG. 2 & CLAIM 3

- **Electroosmotic Solute Drag:** By applying a controlled biocompatible micro-current (0.3 to 0.5 mA/cm²), an electromotive force drives mobile hydrated cations (Na⁺) across the negatively charged stratum corneum. Neutral glucose molecules are dragged along in the convective interstitial fluid stream toward the surface.
- **Automated Polarity Reversal Control:** The on-board microcontroller (MCU) executes a periodic polarity alternation cycle (every 3 to 10 minutes, alternating Anode (+) and Cathode (-)).
- **Physiological Protection:** Polarity reversal reverses localized hydronium (H⁺) and hydroxyl (OH⁻) accumulation, neutralizing pH drift, preventing electrochemical burns, and halting electrode passivation.

3.4 Microfluidic Channel Layer & Hybrid Micropatterning (Fig. 3, Claims 2, 4, 5)

A primary bottleneck in transdermal sensing is transporting microscopic volumes (nanoliters) of extracted ISF from the skin surface to the sensor chamber without requiring bulky mechanical micro-pumps. The patent solves this via a sophisticated passive-active fluidic matrix:

Structural Element	Physical Mechanism	Functional Benefit
Inlet Capillary & Electrostatic Intake	Channel inlet positioned directly contiguous to the RI electrode pair; utilizes spontaneous capillary action combined with electrokinetic force.	Instantaneous suction of ISF droplets the moment they emerge on the stratum corneum; zero air exposure.
Alternating Hydrophilic & Hydrophobic Patterns	Micro-scale periodic patterns patterned along channel sidewalls (Claims 1 & 2). Localized surface energy gradients establish continuous Laplace pressure.	Prevents fluid pinching, meniscus breakdown, and stagnant bubble entrapment; guarantees steady-state, laminar fluid flow to sensor.
50nm Nanoporous Separation Barrier	Integrated size-exclusion membrane filter located upstream of the sensing chamber (Claim 5).	Physically intercepts detached keratinocytes, large sweat proteins, albumin, and cosmetic emulsions; allows unhindered passage of glucose (MW: 180 Da).
Hydrophobic Gas-Permeable Vent	Positioned adjacent to the channel outlet; gas-permeable PTFE/PVDF membrane structure (Claim 5).	Selectively exhausts microscopic air bubbles generated during iontophoresis, preventing optical scattering errors in the sensing cell.

Multi-Modal Sensing & Ultrasonic Self-Cleaning

Detailed breakdown of Claims 6, 7 & 11: Dual-laser spectroscopy and piezoelectric anti-fouling

4.1 Multi-Wavelength Optical Differential Attenuation Sensor (Fig. 4, Claim 7)

The primary biosensing modality utilizes dual-wavelength laser spectroscopy operating in the near-infrared (NIR) / mid-infrared (MIR) vibrational absorption spectrum of the glucose molecule. Rather than relying on single-beam measurements susceptible to turbidity and matrix shifts, a differential cancellation architecture is implemented:

Primary Measurement Beam (λ_1)

1650 nm (or 2100–2300 nm band): Specifically targets the strong overtone absorption peaks of glucose's C-H and O-H molecular vibrational bonds.

Reference Baseline Beam (λ_2)

1310 nm (1300–1400 nm band): Exhibits near-zero glucose absorption while experiencing identical optical scattering from water, cellular debris, and ISF proteins.

The real-time differential absorption equation executed by the microprocessor is defined as:

$$\Delta A = A_{\lambda_1} - (\alpha \cdot A_{\lambda_2} + \beta) \qquad C_{\text{glucose}} = k \cdot \Delta A$$

Where A_{λ_1} is raw absorbance at 1650 nm, A_{λ_2} is baseline absorbance at 1310 nm, α is the media scattering differential coefficient, β is systemic dark-current offset, and k is calibration slope.

4.2 Alternative & Auxiliary Modalities

The patent explicitly protects two complementary / modular biosensing modalities to suit various OEM fabrication capabilities:

- **Electrochemical Dual Electrode (Claim 7):** Integrates an immobilized Glucose Oxidase (GOx) Working Electrode paired with a parallel *No-Enzyme Control Electrode*. Real-time differential subtraction eliminates background redox noise.
- **Localized Surface Plasmon Resonance / Refractive Index (Claim 7):** Employs a Micro-Ring Resonator to track resonance wavelength shift ($\Delta\lambda_{\text{shift}}$), providing extreme sensitivity to glucose refractive index changes independent of dye reagents.

4.3 Piezoelectric Self-Cleaning Subsystem

PATENT REFERENCE: FIG. 5 & CLAIMS 6, 11

A persistent failure in microfluidic biosensors is *bio-fouling*—irreversible deposition of denatured proteins and cellular fragments. The patent solves this via an active acoustic cleaning mechanism:

- **Piezoelectric Ultrasonic Actuator:** Generates acoustic micro-vibrations across 20 kHz to 2 MHz (optimized at **40 kHz to 100 kHz resonance**).
- **Acoustic Streaming & Shear Detachment:** Induces intense high-shear micro-vortices that mechanically strip adhering proteins off channel walls and electrodes within **2 to 10 seconds**.
- **High-Pressure Back-Flushing:** Expels contaminated fluid out through waste channels, restoring pristine initial baseline conditions.

4.4 Autonomous Triggering Logic for Self-Cleaning Cycle

Condition A: Dark Current Drift

When optical receiver dark current drifts by $> \pm 5\%$ from baseline, indicating optical window fouling.

Condition B: Cycle Count Threshold

Autonomous execution every 10 to 15 measurement cycles to prevent micro-scale sediment build-up.

Condition C: Zero-Current State

RI micro-current is completely gated OFF during ultrasonic firing to eliminate electrical and thermal skin stress.

2-Step Composite Error Correction Engine

Detailed mathematical analysis of Claims 12 & 13: Eliminating matrix interferents & thermo-optic drift

5.1 The Fundamental Challenge: Eliminating ISF Confounders

In non-invasive transdermal sensing, interstitial fluid is not pure glucose in water; it contains variable ionic concentrations, lactic acid, ascorbic acid, cosmetic residues, and fluctuating epidermal hydration. Furthermore, physical motion alters fluidic flow rates, and ambient temperature shifts alter optical refraction. Tink Innovation's patent provides a **patented two-step composite mathematical calibration pipeline** (Claims 12 and 13) that purges these confounders sequentially.

5.2 Step 1: Electrochemical Noise Extraction

PATENT REFERENCE: FIG. 6 & CLAIM 12(B)

An immobilized enzyme electrode (Working) and non-enzyme electrode (Control) measure currents simultaneously:

$$I_{\text{net}}(t) = I_{\text{total}}(t) - I_{\text{bg}}(t)$$

Where I_{total} represents combined glucose and non-specific redox currents, and I_{bg} isolates background electrochemically active interferents (uric acid, acetaminophen, perspiration ions).

The background current $I_{\text{bg}}(t)$ is dynamically scaled and subtracted from the raw optical absorbance signal:

$$A_{\text{corrected1}} = A_{\text{raw}} - (\alpha \times I_{\text{bg}}(t))$$

α is the experimentally calibrated optical-electrochemical cross-coupling constant.

5.3 Step 2: Thermo-Optic & Density Decoupling

PATENT REFERENCE: FIG. 7 & CLAIM 12(C)

Fluid temperature changes alter the fluid refractive index (dn/dT), distorting the optical path length. Step 2 decouples thermal drift from pure density variation:

$$\Delta n_T = (dn/dT) \times \Delta T$$

The pure fluid density refractive index n_{fluid} is isolated by subtracting the thermal component from measured total index shift Δn_{meas} :

$$n_{\text{fluid}} = n_{\text{base}} + (\Delta n_{\text{meas}} - \Delta n_T)$$

The final, pristine glycemic output is computed via:

$$\text{Final_Output} = \beta \times [A_{\text{corrected1}} / n_{\text{fluid}}]$$

β is the universal opto-fluidic system calibration coefficient.

5.4 Clinical Accuracy Target: Achieving Sub-10% MARD Benchmark

In clinical diabetology, the **Mean Absolute Relative Difference (MARD)** evaluates CGM accuracy against venous reference blood (YSI analyzer). While invasive CGMs achieve 8.5–9.5% MARD, uncorrected non-invasive prototypes traditionally suffer from 18–25% MARD due to environmental noise.

Correction Layer	Error Source Targeted	Isolated Impact	Cumulative Expected MARD
Raw Physical Extraction	Skin surface contamination & evaporation	-4.0% MARD drift	~18.5% (Uncompensated)
Algorithmic Step 1 (Claim 12b)	Sweat, cosmetic redox ions & background noise	-5.2% MARD reduction	~13.3% (Chemically Corrected)
Algorithmic Step 2 (Claim 12c)	Thermo-optic expansion & fluid viscosity changes	-3.8% MARD reduction	< 9.5% (Clinically Actionable)

*Note: Target metrics based on patent mathematical simulation models; subject to empirical clinical verification during Phase 2/3 joint development.

Wearable Ecosystem & Predictive AI Platform

Detailed breakdown of Claims 8–10: Smartwatch interlock, multi-biometric fusion, and glycemic AI

6.1 The "GlucoWatch X" Connected Ecosystem (Fig. 8, Claims 8 & 9)

The patent extends beyond an isolated patch by claiming a comprehensive **Smart Device-Interlocked Monitoring Ecosystem**. Operating over ultra-low-power Bluetooth Low Energy (BLE 5.3+), the disposable/semi-reusable patch streams raw sensor telemetry to a consumer smartwatch (e.g., Apple Watch, Samsung Galaxy Watch on Wear OS) or smartphone for distributed computation and real-time visualization.

6.2 Multi-Biometric Fusion: Solving ISF Lag

PATENT REFERENCE: CLAIM 8

A notorious physiological challenge in transdermal glucose monitoring is the **5 to 15-minute physiological lag time** between intravascular blood glucose and interstitial fluid (ISF) diffusion. Tink Innovation solves this dynamically by leveraging the host smartwatch's sensor suite:

- **Continuous Skin Temperature (PPG/Thermistor):** Adjusts the fluid diffusion coefficient, compensating for vasoconstriction or vasodilation.
- **Heart Rate (HR) & HRV:** Quantifies sympathetic nervous tone and autonomic arousal influencing glucose uptake.
- **Accelerometer / Metabolic Equivalents (METs):** Measures real-time exercise exertion to predict acute muscle glycogen depletion.
- **Dynamic Lag Warping:** Machine learning algorithms continuously contract or expand the lag compensation filter based on instantaneous metabolic burn rates.

6.3 Predictive AI & Cloud Analytics

PATENT REFERENCE: CLAIM 10

The smartwatch and mobile hub communicate with a centralized HIPAA-compliant AI Healthcare Database to deliver forward-looking clinical intelligence:

- **Multimodal Data Correlation:** Concurrently maps continuous glucose trends against logged dietary macronutrients, sleep architecture (REM vs. Deep sleep stages), and stress levels.
- **Predictive Hypo/Hyperglycemia Warning:** Neural network models generate early alert vectors **15 to 30 minutes in advance** of projected dangerous threshold breaches.
- **Adaptive Baseline Calibration:** Neural networks continuously personalize the baseline parameters (α , β , k) to each patient's individual epidermal thickness and sweat pore distribution.

6.4 Wearable User Interface & User Experience (UI/UX) Specifications

Real-Time Watch Face UI

Prominently displays real-time numerical glucose (mg/dL or mmol/L), 24-hr trendline sparkline, and directional delta velocity arrows (↑↑, ↗, →, ↘, ↓↓).

Haptic Emergency Alerts

Immediate vibrotactile haptic pulsing upon detecting acute hypoglycemic trajectory (< 70 mg/dL), critical for preventing nocturnal diabetic shock.

Hardware Diagnostics

Telemetry displays remaining patch battery life, microfluidic channel fouling index, and countdown to automated ultrasonic self-cleaning cycles.

Development Status, Engineering Roadmap & Risks

Transparent technical disclosure and a rigorous 30-month commercial translation plan

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7.1 Transparent Status Disclosure: Ground-Floor Intellectual Asset

Tink Innovation maintains strict transparency with potential partners: This patent application represents an advanced, highly novel *architectural and theoretical design*. The formal Korean patent application has been registered and filed, securing clear priority dates, with PCT international filing actively underway. **The physical microfluidic fabrication, integrated hardware prototypes, and empirical clinical validation datasets have not yet been produced.** This early development status offers the acquiring or co-development partner an unencumbered, highly moldable IP asset that can be seamlessly adapted to proprietary semiconductor, optical, or consumer hardware ecosystems.

7.2 Four-Phase Co-Development & Translation Roadmap (TRL 2 → TRL 7)

Phase / Timeline	Core Objective	Key Engineering Deliverables	Exit Gate / Milestone
Phase 1 (Months 1–6)	Benchtop Microfluidics & Optical Bench	Photolithography / soft-lithography microfluidic mold; laser diode bench verification (1650/1310nm); synthetic ISF extraction testing.	In vitro validation of differential optical absorption & acoustic detachment.
Phase 2 (Months 7–14)	Integrated Wearable Patch Prototype	Rigid-flex PCB integrating MCU, BLE 5.3, piezoelectric driver, and PDMS fluidic patch cartridge; firmware execution of 2-step algorithm.	Working engineering prototype (alpha unit); continuous extraction test on artificial skin.
Phase 3 (Months 15–22)	Pre-Clinical Animal In Vivo Studies	Porcine animal clamp models; comparison against venous YSI 2300 reference glucose; dynamic lag-time biometric model refinement.	Demonstration of MARD < 12% across hypoglycemic and hyperglycemic swings.
Phase 4 (Months 23–32)	Human Pilot Clinicals & Regulatory Filing	First-in-Human (FIH) IRB clinical trials; IDE submission to US FDA (Breakthrough Device Designation) & European CE-MDR filing.	Human clinical MARD < 10%; regulatory dossier submission for market clearance.

7.3 Technical Risk Engineering & Patented Countermeasures

Technical Challenge	Underlying Physical Risk	Patented Engineering Countermeasure
Skin Erythema & Blistering	Continuous DC iontophoresis drives localized pH extremes (<3 or >9) and burns.	Periodic polarity reversal (every 3–10 min) continuously neutralizes ion buildup (Claim 3).
Sensor Passivation (Fouling)	Interfering proteins adhere irreversibly to optical sensing windows.	Piezoelectric ultrasonic vibration (40–100 kHz) generates shear acoustic back-flush (Claim 6).
Sweat / Perspiration Shock	Sudden heavy exercise perspiration floods sensor with electrolytes.	Hermetic PDMS perimeter seal + 50nm filtration barrier + ECG sweat sensor trigger (Claims 1, 5).

Intellectual Property Acquisition & Licensing

Structuring outright asset transfer, global assignment, or exclusive field-of-use licensing

8.1 Strategic Rationale for Full IP Acquisition

For established medical device corporations (Abbott, Dexcom, Medtronic, Roche) or consumer hardware conglomerates (Apple, Samsung, Google), outright IP acquisition delivers immediate competitive preemption. Acquiring Tink Innovation's patent portfolio locks down the foundational IP combining reverse iontophoresis with microfluidic self-cleaning and multi-wavelength differential correction, preventing competitors from establishing a needle-free foothold.

8.2 Structure 1: Full Asset Assignment (Buyout)

Total and irrevocable transfer of all global intellectual property rights from Tink Innovation to the acquiring partner:

- **Scope of Transfer:** 100% legal title to Republic of Korea Patent Application, priority rights under the Paris Convention / PCT, all architectural design files, and full prosecution power.
- **Global Jurisdiction Filing:** The buyer takes immediate leadership of PCT national phase filings in the US (USPTO), Europe (EPO), China (CNIPA), and Japan (JPO).
- **Clean Chain of Title:** Tink Innovation guarantees clear, unencumbered title, free of any third-party liens, institutional grants, or academic encumbrances.
- **Consideration Structure:** Upfront asset transfer payment + potential deferred clinical milestone bonuses.

8.3 Structure 2: Exclusive Global Licensing

Worldwide exclusive license granting full rights to manufacture, develop, and commercialize across all clinical and consumer fields:

- **Field-of-Use Exclusivity:** Exclusive rights spanning human medical diabetes care, non-prescription metabolic wellness, and sports performance wearables.
- **Territory:** Global (Worldwide) with right to sub-license to tier-1 manufacturing partners.
- **Upfront Technology License Fee:** Payable upon definitive licensing agreement execution.
- **Running Commercial Royalties:** 3.0% to 5.5% on Net Sales of commercialized patches and recurring fluidic cartridges, subject to annual minimum royalty covenants.

8.4 Indicative Commercial Milestone Schedule (Acquisition / Licensing)

Development Stage	Milestone Event Definition	Contractual Consideration
Execution	Signing of Definitive Transfer Agreement & PCT Power of Attorney.	Upfront Assignment / License Fee
Milestone 1	Successful In Vitro Benchtop Demonstration of Microfluidic Flow & Extraction.	Technical Milestone Payment 1
Milestone 2	Completion of Human Pilot Clinical Study demonstrating MARD < 10%.	Clinical Milestone Payment 2
Milestone 3	Regulatory Approval (US FDA 510(k)/PMA or CE Mark Clearance).	Regulatory Milestone Payment 3
Commercialization	First Commercial Sale in Major Market (US, EU, or APAC).	Commercial Launch Royalty Initiation

8.5 PCT International Prosecution Strategy

Because the Korean patent application is currently on file, the 12-month priority window under the Paris Convention is open. Tink Innovation will collaborate with the acquirer's chosen patent counsel to coordinate the formal PCT International Filing, tailoring the international claim set to maximize broad patent protection across semiconductor integration and wearable smartwatch ecosystems.

Strategic Joint Venture (JV) & Turnkey Co-Development

A collaborative risk-sharing model combining proprietary IP with world-class engineering execution

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9.1 Collaborative Synergy: Building a Market-Leading NewCo

For strategic corporate partners seeking equity upside and a shared-risk operational model, Tink Innovation proposes establishing a **Joint Venture Operating Entity (NewCo)**. This framework unites Tink Innovation's foundational patent architecture with the strategic partner's industrial fabrication, capital strength, clinical trial infrastructure, and global distribution muscle.

9.2 Tink Innovation Contributions

- **Exclusive Global IP Contribution:** Exclusive, irrevocable contribution of the entire patent estate into NewCo.
- **System Architectural Leadership:** Deep domain advisory on reverse iontophoresis duty cycles, microfluidic channel layout, and 2-step algorithmic firmware.
- **Korean Semiconductor & MEMS Linkage:** Facilitating rapid access to South Korea's world-leading microfabrication, flexible electronics, and MEMS foundry ecosystem.
- **Executive Representation:** Continued strategic governance and advisory board participation.

9.3 Strategic Partner Contributions

- **R&D Tranche Financing:** Funding Phase 1–4 prototyping, bench fabrication, clinical trials, and regulatory clearance.
- **Advanced Cleanroom & MEMS Fab:** Precision micro-molding for PDMS/PI channels and cleanroom assembly.
- **Clinical & Regulatory Machinery:** Managing GCP-compliant clinical trials, Institutional Review Board (IRB) filings, and FDA/EMA dossiers.
- **Global Distribution & Commercial Scale:** Integration into established hospital networks, pharmacy distribution, or consumer wearable retail.

9.4 Governance, Equity Allocation & Tranche Milestones

NewCo equity and voting rights are structured according to capital commitment, technical milestones, and valuation benchmarks:

Funding Tranche	Capital Allocation Focus	Target Technical Deliverable	Equity Vesting Gate
Seed Tranche	NewCo incorporation, PCT international filings, photolithography tooling.	Functional microfluidic chip & bench optical sensor rig.	Foundational Closing
Tranche 1 (Series A)	Integrated patch prototyping, flexible PCB layout, firmware coding.	Wearable alpha patch with BLE smartwatch interlock.	Working Alpha Milestone
Tranche 2 (Series B)	Large-scale animal studies, ISO 13485 fabrication, human pilot clinicals.	Human clinical validation demonstrating MARD < 10%.	Clinical Gate Validation
Commercial Tranche	FDA PMA / 510(k) review, global production scaling, launch marketing.	Pivotal clearance and global commercial launch.	Full Commercial Scale

9.5 Exit Mechanisms & Strategic Value Realization

The Joint Venture agreement will incorporate clear, institutional exit paths: (1) **Partner Call Option / Buyout** at predetermined revenue/clinical multiples; (2) **Trade Sale / M&A** to a mega-cap tech or pharma acquirer; or (3) **Independent Initial Public Offering (IPO)** on NASDAQ or Korea Exchange (KRX).

Unit Economics, Cost Structure & Projections

Disrupting CGM economics through a high-margin semi-reusable architecture

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10.1 The Hardware Economic Model: Consumable vs. Reusable Division

A fatal economic limitation of existing subcutaneous CGMs (Dexcom, Abbott) is that each 10–14 day sensor discards sophisticated micro-electronics, batteries, and transmitters, creating a high cost floor. Tink Innovation's patent enables a **two-part decoupled hardware architecture** that dramatically improves unit economics for both payors and consumers:

Part A: Reusable Smart Hub (1–2 Year Lifespan)

- **Components:** Microcontroller, BLE 5.3 RF transceiver, dual-laser diodes (1650/1310nm), photodetector, piezoelectric driver, rechargeable lithium polymer cell, and inductive wireless charging coil.
- **Target BOM at Scale (100k+ units):** \$32.00 – \$45.00
- **Target Consumer Retail Price:** \$99.00 – \$149.00 (One-time or subsidized via subscription).

Part B: Consumable Fluidic Patch (Weekly Replacement)

- **Components:** PDMS/PI flexible substrate, patterned RI electrode layer, microfluidic micropattern channel, 50nm filtration membrane, and medical skin adhesive ring.
- **Target COGS at Scale (Roll-to-roll):** \$2.20 – \$3.50 per patch
- **Target Pack Pricing (4 patches / month):** \$39.00 – \$59.00 / month (vs. \$250–\$350/mo for Abbott/Dexcom).
- **Gross Profit Margin:** 75% – 82% on high-velocity recurring consumable.

10.2 Five-Year Commercial Adoption & Revenue Projection Model

Financial & Operational Metric	Year 1 (Launch)	Year 2	Year 3	Year 4	Year 5
Active Monthly Subscribers	25,000	85,000	240,000	600,000	1,400,000
Hardware Transceivers Sold	30,000	95,000	270,000	680,000	1,550,000
Hardware Revenue (\$M)	\$3.6M	\$11.4M	\$32.4M	\$81.6M	\$186.0M
Consumable Patch Revenue (\$M)	\$11.7M	\$43.3M	\$132.5M	\$338.4M	\$806.4M
Total Gross Revenue (\$M)	\$15.3M	\$54.7M	\$164.9M	\$420.0M	\$992.4M
Blended Gross Margin (%)	68.5%	72.4%	76.0%	78.5%	80.2%

*Projections assume dual-channel distribution: 60% Medical Prescription (reimbursed CGM) and 40% Direct-to-Consumer Metabolic Wellness.

10.3 Channel 1: Clinical Diabetes Care

Targeting insulin-dependent Type 1 and Type 2 diabetics seeking a needle-free lifestyle. Reimbursable under DME (Durable Medical Equipment) codes in the US, statutory health insurance in Europe, and national insurance across Asia.

10.4 Channel 2: Mass Consumer Wellness

Unlocking the massive untapped 500M+ prediabetic, longevity, biohacking, and athletic performance demographic who categorically refuse needle-based CGMs, sold directly through smartwatch app store ecosystems.

Corporate Profile, Legal Terms & Next Steps

Executing mutual non-disclosure, term sheet alignment, and project kickoff

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11.1 Proposing Entity Profile

Company:	Tink Innovation
Representative:	Sungchu Kang, CEO
Inquiries Email:	staping@naver.com
Headquarters:	Seoul, Republic of Korea
IP Portfolio:	KR Patent Application Filed PCT International in Prep

Tink Innovation is a specialized intellectual property holding and advanced technology development enterprise based in Seoul, dedicated to architecting disruptive medical device and sensor solutions.

11.2 Structured 4-Step Engagement Protocol

- **Step 1: Mutual Non-Disclosure Agreement (M-NDA)**
Execution of standard institutional bilateral NDA within 5 business days to permit unrestricted technical and patent file review.
- **Step 2: Technical Deep-Dive & Architecture Review**
Bilateral technical workshop between Tink Innovation leadership and partner's engineering/clinical teams to review patent claims and microfluidic specs.
- **Step 3: Commercial Term Sheet Alignment**
Selection and negotiation of primary commercial model (Option A: Asset Transfer / Licensing vs. Option B: Joint Venture NewCo).
- **Step 4: Definitive Execution & PCT Filing Coordination**
Execution of definitive contracts and joint filing of PCT International Applications prior to priority deadline.

11.3 Important Legal Disclaimers & Development Stage Notice

Confidentiality Notice: This proposal document contains proprietary, legally privileged intellectual property descriptions belonging exclusively to Tink Innovation. Unauthorized copying, disclosure, or distribution without prior written authorization is strictly prohibited under international copyright and trade secret laws.

Development Stage & Forward-Looking Disclosures: As explicitly disclosed herein, the technology and underlying architecture are in the filed patent stage. Physical hardware prototypes, microfluidic devices, benchtop data, and human clinical datasets have not yet been manufactured or empirically collected. All clinical performance targets (e.g., MARD < 10%), financial models, BOM targets, and market adoption projections represent engineering estimates and forward-looking economic models based on patent claim specifications and published academic literature. Definitive terms, warranties, and performance covenants shall be governed exclusively by definitive agreements executed between the parties.

Initiate Strategic Partnership Discussions Today

Direct all expressions of interest, bilateral NDA inquiries, and technical consultation requests directly to the executive office:

Executive Contact: Sungchu Kang (CEO) — staping@naver.com

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