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Financial Engineering for Preventive Health Assets

A Blended Finance for Swiss Metabolic Screening

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Pilot Phase: Transactional Benchmarks (12-Month Deployment)

Capitalization	CHF 1.5M	**Target MOIC (B)**	1.3x–1.5x	**Target IRR**	20%
First-Loss Tranche	25%	**Risk Instrument**	Pref. Equity	**Pref. Coupon**	8% (Cum.)
Diagnostic Yield	≥20%	**Breakeven**	2,235 Screens	**Avoided Care Cost**	CHF 0.13M

Project Thesis: Empirical Capital Allocation

The EDEN Pilot Special Purpose Vehicle (SPV) transforms fragmented preventive health—digital triage, lab diagnostics, and insurer settlement—into a single, bankable infrastructure asset, solving the timing mismatch between upfront screening costs and long-term avoided care savings.

Prior analyses show digital screening for type 2 diabetes is highly cost-effective, with an ICER of CHF 2,912 per QALY and a 93.2% probability of cost-effectiveness. Realizing this value requires overcoming a timing mismatch in cash flows: nationwide rollout creates an immediate "prevalence tax," requiring about CHF 27M in Year 1 to clear the backlog of undiagnosed cases.

The Preventive SPV closes this gap by financing low-cost digital triage and confirmatory blood tests (CHF 75), matching these upfront costs with future savings from avoided complications. Pro forma modeling shows strict success thresholds: digital triage must be priced at ≥ 40 per month, customer acquisition costs must stay < 200, and screening uptake must reach $\geq 10\%$. Under these assumptions, the SPV becomes cash-flow positive in Year 4 but has only a 57% chance of cumulative breakeven over seven years.

By tracking real-world digital attrition and diagnostic conversion, the SPV tests the intervention's viability frontier. Current modeling shows a strong median IRR of 46.2% but a slightly negative median NPV (CHF -127,147) under baseline. Reducing this operational uncertainty generates the clinical and economic evidence needed to support pathway-based reimbursement and to shift from direct-to-consumer revenues to sustainable B2B integration ahead of full national scaling.

Proposing Capital Structure

The Preventive SPV utilizes a blended capital stack to insulate senior implementation equity:

- **Tranche A (First-Loss - 25%):** CHF 375k public/catalytic capital. Absorbs first 25% of aggregate losses. Optional capped return of 1.05x MOIC if Base Case KPIs are achieved or accept no return as a catalytic capital.
- **Tranche B (Preferred Equity - 75%):** CHF 1.125M institutional capital. 8% cumulative preferred coupon (non-compounding). Senior to Tranche A in all distributions.

Distribution Waterfall

1. **OpEx Recovery:** Settlement of SPV-level liabilities and audit costs.
2. **Tranche B Priority:** 100% capital return + 8% cumulative coupon.
3. **Tranche A Principal:** Repayment of Tranche A capital (to extent not written down).
4. **Upside Sharing:** Residual proceeds split by tier (Base Case: 80% B / 20% Sponsor Carry).

Performance Tiers & Settlement Benchmarks

Performance Tier	Milestone (Screens / Yield / Customer Aquisition Cost)	MOIC (B)	Carry
Downside Case	1,000 | yield < 5% | CAC > 200	≈ 1.10x	10%
Base Case	≥ 2,235 | yield ≥ 10% | CAC ≤ 200	**1.30x–1.40x**	**20%**
Upside Case	≥ 5,000 | yield ≥ 15% | CAC ≤ 100	1.50x–1.60x+	30%

Use of Proceeds (12-Month Allocation)

Category	Allocation (CHF)	Strategic Deliverable
App Development & Maintenance	350,000	Platform build and annual SaaS upkeep.
Personnel (Manager & Technician)	215,000	Lean operations setup (1 manager, 1 tech).
Customer Acquisition & Operations	150,000	Recruitment of 639 active users (CAC ≤ 200).
Regulatory & Compliance	45,000	CE MDR (Rule 11) & revFADP compliance.
Total Year 1 Expenses	**760,000**	**Business-to-Consumer Market Entry**

Exit Pathway: The Phase 2 Infrastructure Bridge

Validated results trigger refinancing into the National Infrastructure SPV (CHF 20.0M, 10-year tenor, 7–9% yield). Tranche B investors hold a Right of First Offer (ROFO) and a conversion option at a 15% discount to NAV. This refinancing mechanism acts as a critical bridge to B2B reimbursement pathways, integrating the venture into established Tier-1 insurer wellness ecosystems (e.g., CSS active365, Helsana+, or SWICA BENEVITA). Pro forma modeling indicates that a standalone B2C model struggles to achieve cumulative breakeven by Year 7, highlighting that long-term sustainability requires transitioning to these reimbursed B2B platforms. To bridge the validation period until statutory reimbursement is secured, alternative financing instruments such as Health Impact Bonds or Innosuisse innovation grants will be leveraged.

Risk Mitigation: Operational & Counterparty

- **Blockchain Audit Layer & Regulatory Compliance:** Contractual requirement for payer settlement, ensuring Success Fees are only triggered upon certified lab HbA1c verification (≥ 6.5%). To legally support this audit layer, the Software as a Medical Device (SaMD) must maintain rigorous adherence to Swissmedic guidelines for CE MDR certification. Furthermore, strict compliance with the revFADP/GDPR mandates encrypted hosting and continuous safety surveillance to mitigate liability risks associated with AI-based predictive models.
- **Carrier Commitment & Health Technology Assessment (HTA):** Drawdown is contingent upon executed success-fee contracts with ≥2 Tier-1 carriers (Helsana, CSS, KPT or equivalent). Securing these outcome-based contracts requires satisfying Swiss HTA criteria for clinical effectiveness, appropriateness, and cost-efficiency. Payers require validated clinical outcomes, specifically a 6.5% weight reduction or HbA1c improvement, to justify systemic reimbursement.

Conclusion

The EDEN framework demonstrates that preventive health can be treated as a high-yield infrastructure asset class. By bridging the gap between clinical research and institutional finance, we provide a pathway for capital to drive systemic healthcare transformation in Switzerland. Technical details regarding Markov cohort simulations, alongside the pro forma Monte Carlo simulations establishing strict B2C viability thresholds (monthly price ≥ CHF 40, CAC ≤ CHF 200, and screening participation ≥ 10%), are provided in the Appendix.

TECHNICAL APPENDIX

Actuarial Assumptions and Methodology for the EDEN Framework

Scientific Validation and Financial Bankability

This infrastructure proposal synthesizes distinct research streams to ensure clinical efficacy and investment readiness:

Validation of Financial Thresholds (Mekniran & Kowatsch, 2026)

Utilizing a Monte Carlo simulation model with 5,000 iterations (published in *BMC Health Services Research*), this research established a deterministic baseline for venture viability. Probabilistic breakeven analysis suggests a 57% probability of the intervention achieving cumulative breakeven over a seven-year horizon. The projected median Internal Rate of Return (IRR) of 46.2% demonstrates a highly attractive rate-based yield, though absolute value creation requires systemic scaling beyond the B2C phase, as indicated by a median NPV of CHF -127,147.

Financial Modeling & Unit Economics

The trajectory in Section 4 is anchored to the following deterministic operational parameters:

- **Unit Revenue (R_{sub}):** Assumed at a strict operational minimum of ≥ CHF 40 per month per active user. This subscription threshold is required to offset the baseline Customer Acquisition Cost (CAC) which must be contained at ≤ CHF 200.
- **OpEx Structure:** Year 1 figures represent CHF 0.76M in total upfront expenses, incorporating high tech-stack amortization (CHF 350,000 for app development and SaaS upkeep) alongside CE MDR and revFADP regulatory compliance setup. Stabilized positive annual cash flow is achieved by Year 4 (at 2,235 active users), assuming economies of scale via lean technician-to-user staffing ratios (1:700).
- **Scaling Logic:** Volume targets represent a progressive digital adoption funnel capturing the undiagnosed Swiss adult population (estimated at 11–30%), targeting ≥ 10% screening participation to scale up to 2,917 active users by Year 7.

Transition to Infrastructure Logic

Research identifies that standalone B2C screening ventures face high volatility, carrying a marginal 57% success probability for cumulative breakeven. To mitigate this, the model mandates a strategic shift to a Payer-Integrated Infrastructure (B2B) approach, integrating into established ecosystems like CSS active365 or Helsana+, to secure sustainable volume commitments and bypass the fragmentation of Swiss cantonal EHR systems.

The Budget Impact and Backlog Methodology

The modeled CHF 0.76M Year 1 Budget Impact represents the one-time system and operational cost to launch the digital screening platform and clear initial adoption hurdles. Because a standalone B2C model falls slightly short of cumulative profitability by Year 7 (reaching CHF -0.19 million), the model identifies that transitioning to outcome-based B2B reimbursement within a bankable 4-to-5 year window is essential for survival. This validation gap forms the empirical foundation for deploying alternative financing instruments, such as Health Impact Bonds or Innosuisse grants, to sustain the venture until institutional payer integration is achieved.

References

[1] Mekniran W, et al. Early health technology assessment of digital diabetes screening in Switzerland: cost-effectiveness and budget impact analyses. *medRxiv preprint*; 2026. doi:10.64898/2026.02.10.26345992. [Under Review at *Nature Health*]

[2] Mekniran W, Kowatsch T. Early viability assessment of a Business-to-Consumer (B2C) model for digital diabetes screening in Switzerland. *BMC Health Serv Res*. 2026 Jan 28.