Foresight for Tomorrow

Quantum-Ready Cyber Security & Digital Technology Global Platform

Riyadh Towards the Top 5 Global Financial Hubs by 2030

Saudi-Japan Ministerial Investment Forum

SYNERGY IN ACTION: JAPAN'S NEW GROWTH STRATEGY AND SAUDI VISION 2030
"FORESIGHT FOR TOMORROW"

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Synergy in Action

- **Theme**: Aligning Japan’s New Growth Strategy with Saudi Vision 2030 and the Expo 2030 **"Foresight for Tomorrow"** initiative.

- **Vision:** Leveraging GVE’s Quantum-Ready platform to elevate Riyadh into the Top 5 Global Financial Hubs by 2030.

The Vision – Riyadh as a Top 5 Global Hub

- **The Goal:** Enable Riyadh to surpass New York, London, and Tokyo in settlement speed.
- **The Innovation:** The world's first **Intra-day Settlement System** for Bonds, Equities, and Commodities (T+0).
- **Economic Impact:** $27 Billion in annual savings for Saudi banks and residents from Year 1.

The Synergy – Japan's Pedigree x Saudi Ambition

- **Proven Technology:** Built by the pioneers of NFC and the world's first mobile payment systems (1997/2004).
- **Strategic Independence:** A platform 100% independent from US tech giants (Visa/MasterCard, SWIFT, AWS/Google Cloud).
- **Data Sovereignty:** Personal data remains inside Saudi; fully aligned with international standards (ISO/IEC 24643).

The Core Advantage – Quantum-Safe Security

- **The Threat:** "Harvest Now, Decrypt Later" – Current PKI will be obsolete by 2030.
- **The GVE Solution:** Patented **Private-Key-Only Infrastructure** (PQC).
- **Superior Performance:** 30% lower OpEx vs. traditional PKI and 1,000x faster auth time than FIPS 205.

The Partnership – A Hub for the Middle East & Africa

- **The Offer:** GVE seeks a Saudi partner to establish a **Riyadh Subsidiary** as the capacity-building hub for MEA.
- **IP Protection:** GVE technology is patented in Saudi Arabia until **December 2040**.
- **Closing:** *"Let Saudi & Japan together build the world's first truly quantum-secure economy."*

Detailed Appendices (For Ministerial Review)

1. **Security Benchmarks: Comparison showing** GVE outperforming US FIPS 203/204/205 in auth time and bandwidth
2. **3 Sector Approach to End-to-End Security**
   - **Pillar 1: The 3-Way Database:** A technological breakthrough beyond blockchain for real-time ledger synchronization and integrity.
3. **Pillar 2: The PKIO Shield to secure the edge**
4. **Founders' Pedigree:** Leadership by the pioneers of NFC and the world’s first mobile payment systems.
5. **Strategic Independence:** Full autonomy from US-based card networks (Visa/Mastercard), cloud providers, and PKI suppliers.

Detailed Appendices (For Ministerial Review)

6. **Summary USP**
7. **Business Model Assumptions**
8. **EU’s Challenge to US Exorbitant Privilege**
9. **GVE v. existing** with unmatched speed and efficiency
10. **One OS for all: GVE OS illustration**
11. **Global Patent Strategy & Saudi Patent**

1. Technological Deep-Dive: GVE v US FIPS comparison

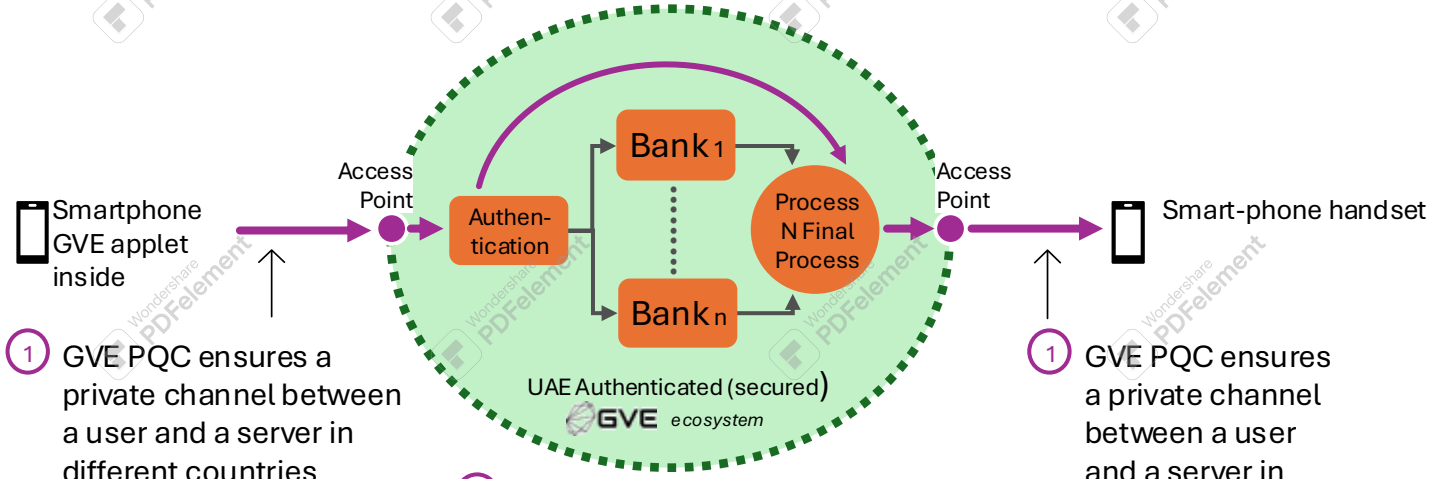
Metric	GVE OS	FIPS 203 (Kyber)	FIPS 204 (Dilithium)	FIPS 205 (SLH-DSA)
Crypto Primitive	Symmetric MAC	Lattice KEM	Lattice Signature	Hash-Based Signature
Key Material / Endpoint	≤ 32 B secret	0.8–1.5 KB pub + 1.6–3 KB sec	1.3–2.6 KB pub + 2.5–4.9 KB sec	32–64 B pub + large state
Handshake / Packet Overhead	16–32 B tag	0.8–1.5 KB ciphertext	2.4–4.6 KB signature	7.8–49 KB signature
Auth Time (40 MHz MCU)	≈ 5 µs	≈ 1–3 ms	≈ 6–25 ms	≈ 100–400 ms
Bandwidth Impact (1 kB msg)	+ 0.02 %	+ 90–200 %	+ 240–460 %	+ 800–3 000 %
PKI Operational Load	None	CSR, CA, OCSP, CRL	As 203 + key-state mgmt	As 204 + tree audits
Quantum Safety Margin	Grover-bounded; double secret	Lattice assumptions	Lattice assumptions	Hash-based; signature bloat
Scalability to IoT	Excellent	Moderate	Poor	Impractical
ISO 24643 Compliance	Native	External wrappers	External wrappers	External wrappers
CapEx / OpEx Estimate*	≈ -30 % vs. PKI	Baseline	+ 25 %	+ 40 %

3 Sector Approach to the End-to-End Cyber Security
GVE compliant to ISO/IEC 24643: inter-operability of IoT
Pillar 1: Implementing 3-way-database (patented in Japan)

3 Sector End-to-End Security Approach in the Post Quantum Cryptography ecosystem

A. It replaces PKI problem with private channels only by private key infrastructure

B. Digital Banking module is protected by 3 way-database technology



1 GVE PQC ensures a private channel between a user and a server in different countries

2 Each user has as many private channels as the number of banks with user's accounts

3
- 3-way-database ledgers synchronize three ledgers in real-time. Each bank's database is based on 3-way-database ledgers enabling the corrupted ledger to be thrown away.
- Two remaining correct databases automatically create a new third database

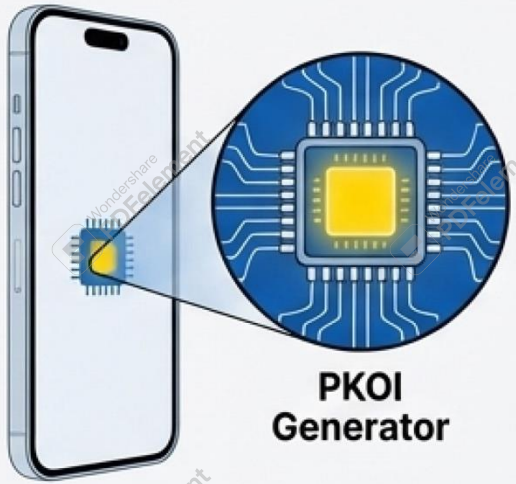
1 GVE PQC ensures a private channel between a user and a server in different countries

Pillar 2: The PKOI Shield to secure the edge.

We will deploy the first quantum-resilient user-to-bank communication channel in Europe.

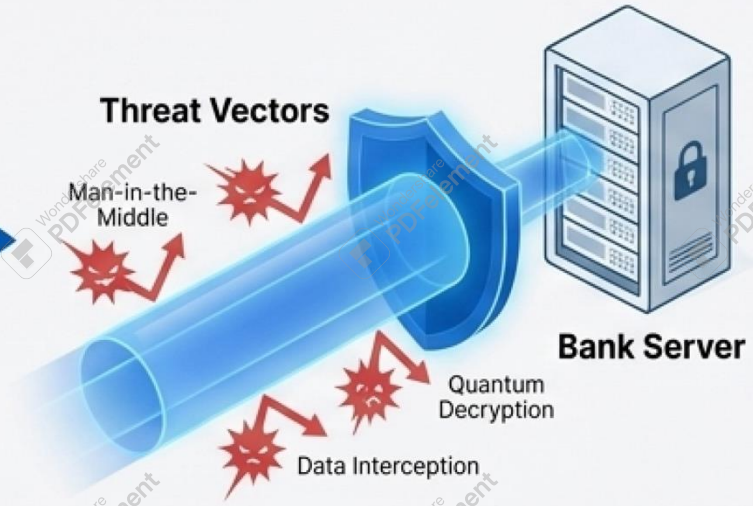
How It Works

Step 1



GVE's Private-Key-Only Infrastructure (PKOI) cryptographic generator is embedded inside the smartphone hardware.

Step 2



This creates a direct, quantum-resilient channel between the user's device and their bank's server.

Step 3

Result: Eliminates the central vulnerability of PKI, providing true end-to-end security.

4. Founders' Pedigree; Unique combination of tech and financial gurus Leadership by the pioneers of NFC and the world's first mobile payment system

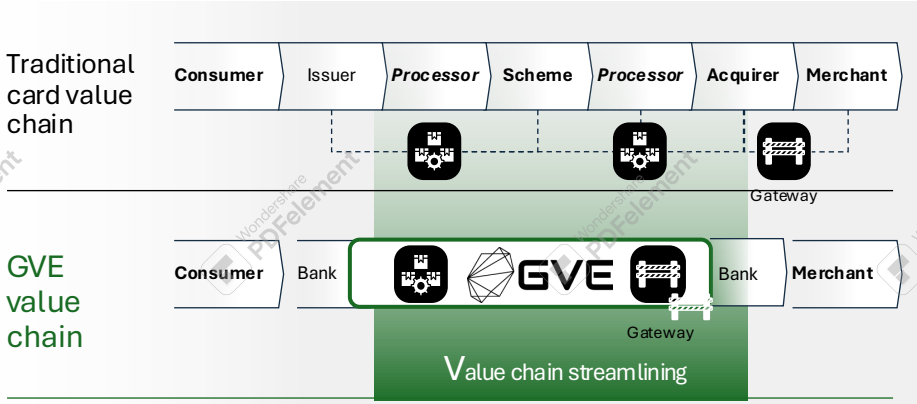
Summary of our co-founders' key achievements

1997	Creation of first smart/contactless card system in the world (NFC)
2004	Creation of world's first mobile payment system
2020	Involved in the creation of ISO 24643 standard for payment system interoperability
2022	Patented private key only infrastructure (PQC technology) in the US, Japan, Singapore, South Africa, Saudi Arabia (valid until December 2040)

5. Strategic Independence: Full autonomy from US-based card networks (Visa/Mastercard), cloud providers, and PKI suppliers.

GVE solution

Overview of GVE role in the payments value chain



Consolidates multiple roles into one:
Replaces multiple layered scheme, processor, acquirer, and parts of issuer systems with a single digital OS

Supports end-to-end secure integration:
Enables real-time settlement across consumer, business, and government transactions on one platform with multiple private channels between users and banks

Payment processing

GVE DESIGN PRINCIPLES

I. Post-PKI security architecture
Built to eliminate reliance on outdated public-key infrastructure, ensuring long-term security resilience and modernization readiness

II. Modular architecture
Enforces separation between systems and real-time isolation capabilities, minimizing attack surfaces and enabling resilient operations

III. Digital-native design
Natively integrates with banking cores, ID systems, and platforms to support frictionless, digital-native transactions

IV. Compliance by design
Aligned with ISO/IEC 24643 and EU private data regulations, helping banks meet compliance needs and accelerate integration

Proprietary device to server confidentiality technology

Proprietary three-way-database to have another level of integrity

6. Summary: GVE delivers a quantum-safe, scalable infrastructure that enables instant settlement and independence from US technologies

USP of GVE

A.1 Quantum-safe
- Replaces PKI with secure private key–based channels
- Secures the Digital Banking module through a three-layer database protection

A.2 Instant settlement
- Domestic (Japan): ≈ 0.2 seconds
- Cross-border: ≈ 2 seconds

A.6 Secure
- Data sovereignty: Personal data stays within the user's bank
- No external copies: No transfer of sensitive information outside
- GDPR compliance: Fully aligned with EU privacy rules

A.3 Connecting the ecosystem
- Applicable across multiple segments, including:
- Retail and wholesale use cases
- Central banks, banks, and financial institutions
- Cross-border settlements for all account holders

A.5 US independent

Independent from:
- Card and payment networks (e.g., VISA, Mastercard, PayPal)
- PKI providers (e.g., RSA/DigiCert and similar cryptography suppliers)
- Cloud operators (e.g., Amazon, Microsoft, Google)

A.4 Scalable and cost efficient
- Handles trillions of transactions with minimal energy use
- Processes >2,800 TPS on a single small server
- Runs at ~1% of existing electronic payment solutions[1)]

1) Benchmarked against Suica, Japan's leading contactless payment and transport card system — comparable to Europe's public transit cards, but operating at much larger scale and efficiency.

7. Business Model Assumptions

- With 35million population and estimated GDP of $1,269 billion in 2025, the annual savings for banks, residents and visitors from Year 1 would be $27billion.
- No more cash delivery car -> Substantial CO^2 reduction – Vision 2030
- Real-time gross settlement by 0.2 seconds for all enables Riyadh to become top five global financial markets as they will enable all bonds, equities, commodity ETF settle intra-day – surpassing New York, London and Tokyo.
- IP payment to GVE (Japan) is only $1 billion and the GVE Riyadh subsidiary/JV could become the hub for capacity building for Africa including Middle East

	Population (2025 Est)		GDP (2025 Est)		Est. Current cost annual	Upfront Investment	Revenue post CBDC ($m), annual maintenance		Annual Savings by financial institutions & residents ($m)		Global payment share %
Country	million	% to global	($bn)	% to global	($m)	($m)	Annual	To JV partners ($m)	Year 1	Year 2	
Saudi Arabia	35	0.44%	$1,269	1.2%	$40,593	$1,030	$12,178	$4,059	$27,386	$28,415	1.35%

Source: Population Worldometer.info as of 9th February 2023
GDP Source the World Bank

8. EU’s Challenge US Exorbitant Privilege

Started Euro 1 January 1999

1. ECB created from the agreement and issue Euro as single currency
2. Challenge US Dollar Exorbitant Privilege
3. Challenge Visa/MasterCard, PayPal, Stable coins by issuing CBDC
4. Recognize needs for PQC – Post-Quantum-Cryptography ← GVE’s patented private key infrastructure has the higher security than US FIPS 203, 204, 205

9. GVE v. existing systems with unmatched instant-settlement speed and efficiency

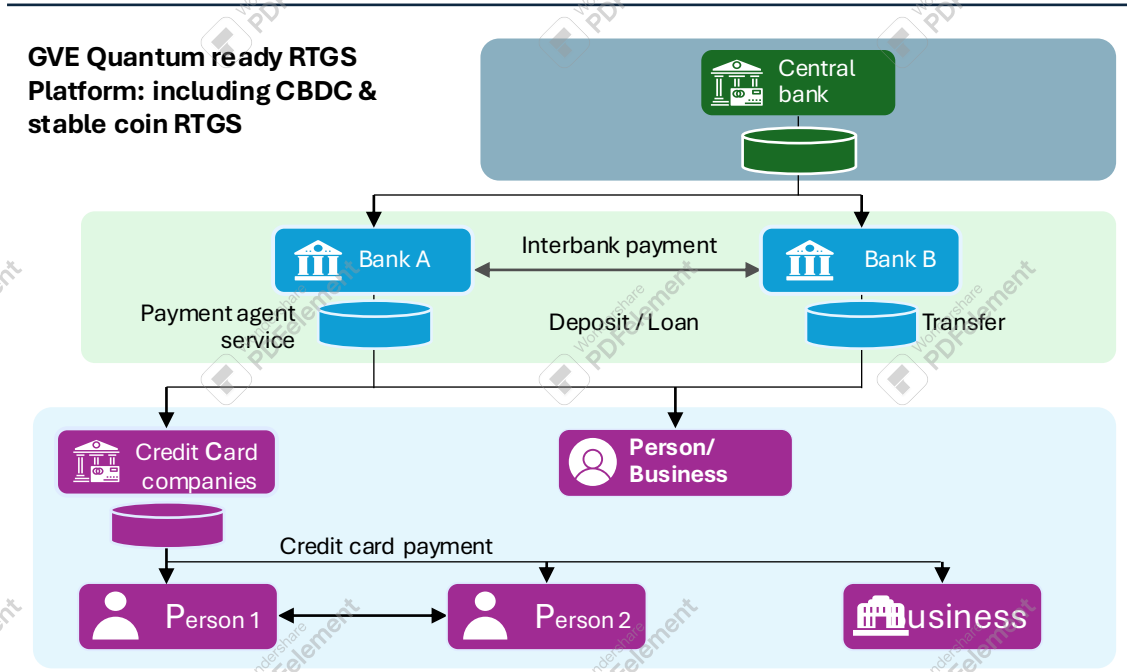
GVE vs. existing solutions

	GVE	Swift	VISA mastercard	PayPal
Scope	Retail and Wholesale	Wholesale	Retail	Retail
Quantum-readiness	✓ Post-PKI, quantum-ready, FeliCa no known hacks	✗ PKI-based; prone to endpoint compromise	✗ Susceptible to relay & skimming attacks	✗ Weak against phishing & account takeover
Settlement speed	Instant (<0.2 sec.)[1]	Hours to days (interbank)	2–9 seconds	0.5–10 seconds
System architecture	Modular MECE design; full stack replacement	Central message-based interbank	4-party (issuer, acquirer, scheme, processor)	Closed-loop platform
Energy efficiency[2]	High (0.29 mWh/tx)	Very low (due to multiple intermediaries)	~1.64 Wh/tx	Not disclosed
Scalability	No limit, designed for national roll-out first	Limited by node capacity & rules	High, but expensive to scale	High, but vendor-controlled
Interoperability	Plug-and-play with core banking and gateway	Global, but bank-dependent configuration	High: Cross-border via schemes	Limited to PayPal network

1) For domestic transactions, ~2 sec. for cross border transactions; 2) Wh/tx stands for watt-hours per transaction

10. One GVE OS for all!

Illustration of GVE OS for retail, wholesale including central banks, banks, FIs, cross border settlements for all who have bank accounts



Available To Introduce The Same System To Every Network

- One of the key requirements in CBDC system
- Available to provide a white-labelled solution
- Patented in the US, Japan, Singapore South Africa & UAE
- Enables to operate the platform at low cost (including low maintenance cost)

1) Transaction fee of Nepal Clearing House is calculated by total transaction revenues divided by transaction volume. 1 NPR= 0.9 JPY
Zengin-Net operates the "Zengin System" which is a nation-wide online network system for banks; Zengin System delivers customers' fund transfers in real time all over Japan.

Source: GVE, Nepal Clearing House, Company Information

11. Global Patent Strategy & Saudi Patent

PCT (Patent Cooperation Treaty)	PCT Application Number	International Filing Date	Designated Countries (Pending OR Registered / Granted)	Application Number	Patent Number	Registration Date / Date of Grant	Local Agent / Associate
PCT 1 (3 way database, buyback system, classification)	PCT/JP2017/ 43716	2017/12/5	India	202048041566			De Penning
			India	202048041568			De Penning
			Japan	2018-504962	6316530	2018/4/6	Kanida
			Japan	2018-018725	7085094	2022/6/8	Kanida
			Japan	2022-077587	7353670	2023/9/22	Kanida
			Singapore	11201910783W	11201910783W	2021/7/20	Allen&Gledhill
			Singapore	10202106981U			Allen&Gledhill
			Singapore	10202106982X			Allen&Gledhill
			USA	16/072,975	10,626,886 B2	2020/4/21	Squire Patton Boggs
			USA	16/816,809	11,341,576 B2	2022/5/24	Squire Patton Boggs
			USA	16/816,843	11,341,577 B2	2022/5/24	Squire Patton Boggs
PCT 2 (Issuer becomes market participant)	PCT/JP2018/ 21442	2018/06/05	Japan	2018-558789	6580277	2019/09/06	Kanida
PCT 3 Private Key Only System, plus 3 way database expanded (3ウェイ強化板, 鍵権限)	PCT/JP2020/ 44576	2020/12/01	Australia	2020480104			FB Rice
			Canada	3188162			BLG
			China	202080105306.7			China Science
			Egypt	797/2023			spoor fisher
			Egypt	797/2023 D1			spoor fisher
			EPC (European Patent Convent	20 964 212.3			Vossius
			India	202347036891			De Penning
			Indonesia	P00202305129			Allen&Gledhill
			Israel	303200			REINHOLD COHN
			Japan	2021-521544	6963872	2021/10/20	Kanida
			Japan	2021-072727	7064219	2022/4/26	Kanida
			Korea	10-2023-7014469			LEE & YOON
			Korea	10-2025-7042368			LEE & YOON
			Malaysia	PI2023003252			Allen&Gledhill
			Nigeria	NG/PT/PCT/2023/7943	RP NG/PT/PCT/2023 /7943	2025/5/22	spoor fisher
			Philippines	1-2023-551512			SyCip
			Saudi Arabia	523440973	SA 18091	2024/10/20	AGIP
			Singapore	11202304246V			Allen&Gledhill
			South Africa	2023/05692	2023/05692	2024/9/25	spoor fisher
			Thailand	2301003217			Satyapon
			Turkey	2023/003577			AGIP
			UAE (United Arab Emirates)	P6001282/2023			AGIP
			USA	17/922,480	11,816,663 B2	2023/11/14	Squire Patton Boggs
			USA	18/481,686	12,314,940 B2	2025/5/27	Squire Patton Boggs
			USA	19/194,738			Squire Patton Boggs
			Vietnam	1-2023-02561			Allen&Gledhill
PCT 4 Authentication included in the Key System, Data Management System (データ管理, 鍵権限)	PCT/JP2021/ 33437	2021/9/13	Brazil	BR 112024003920-0			dnlegal
			China	202180101740.2			China Science
			EPC (European Patent Convent	21 956 827.6			Vossius
			India	202447028139			De Penning
			Japan	2022-078665			Kanida
			Japan	2021-573617	7085097	2022/6/8	Kanida
			Mexico	MX/a/2024/003078			AVA
			USA	18/686,141			Squire Patton Boggs