ABI RESEARCH COMPETITIVE RANKING

PAYMENT HARDWARE SECURITY MODULE (HSM)

FUTUREX

OVERALL: 85.5 | INNOVATION: 87.5 | IMPLEMENTATION: 83.6

INNOVATION RANK: 1 | OVERALL RANK: 2

FUTUREX

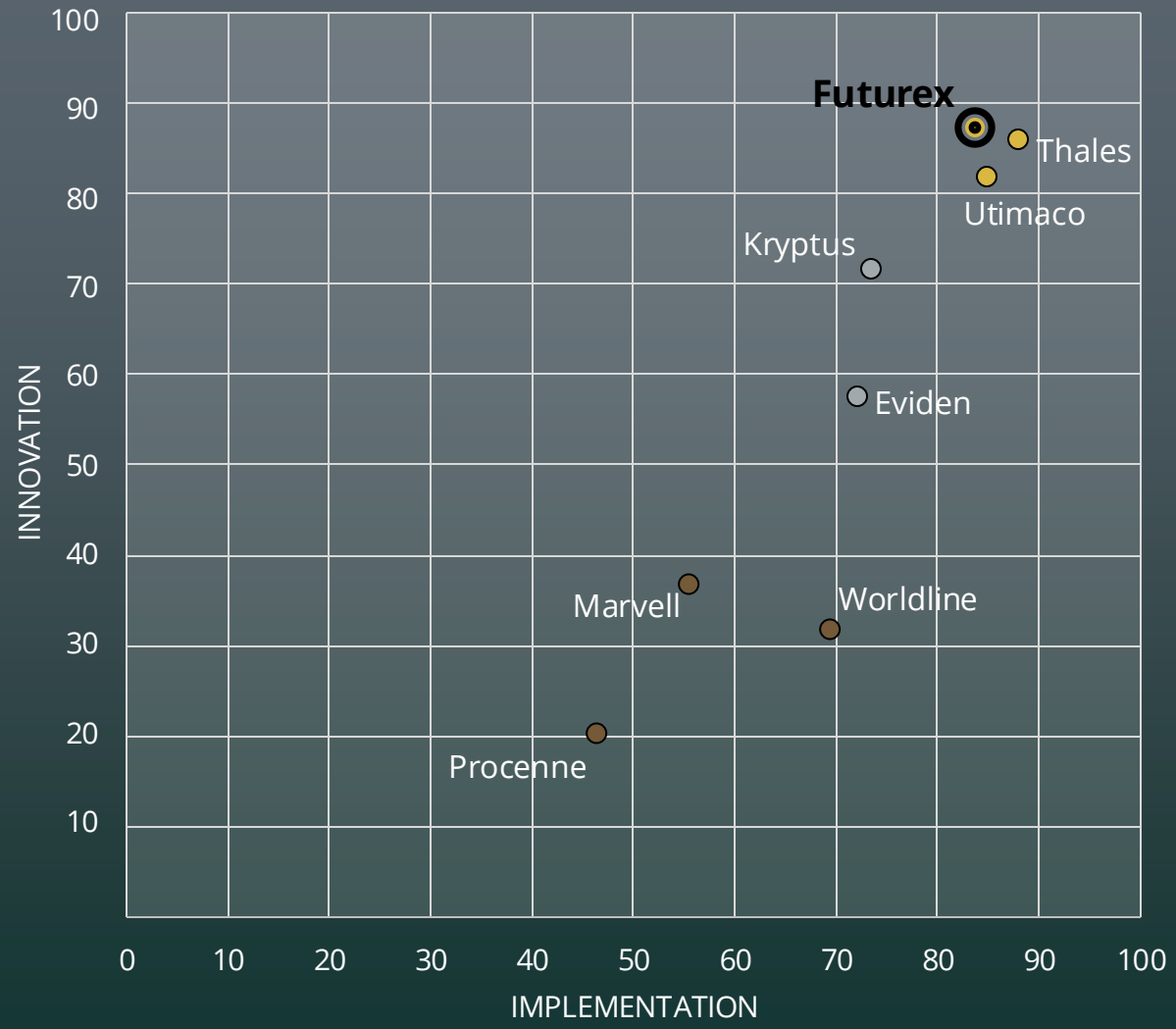
LEADER
ABIresearch.

TOP INNOVATOR
ABIresearch.

TOP IMPLEMENTER
ABIresearch.

OVERALL: 85.5 | INNOVATION: 87.5 | IMPLEMENTATION: 83.6 | RANK: 2

INNOVATION *VERSUS* IMPLEMENTATION MATRIX



INNOVATION

FUTUREX

INNOVATION SCORE: 87.5

The CryptoHub HSM platform boasts a strong suite of configuration options and capabilities. The architecture is fairly unique, with an emphasis on feature-richness and virtualization support. For the latter, in particular, up to 75 virtual HSMs can be created within the HSM's security boundary (which is both PCI and FIPS validated), with robust multitenancy capabilities and efficient resource utilization as a key differentiator.

Each virtual HSM hosts its own firmware instance and security policy, enabling flexibility for different applications. The architecture is also designed to prevent the "noisy neighbor" problem, by walling off each virtual HSM with a maximum resource allocation. This type of isolation (rather than through middleware, for example) ensures that the performance of one virtual HSM does not impact others sharing the same physical hardware.

Another strength in Futurex's architecture is the identity management design, which includes granular role-based access control. This enables the creation of multiple administrative roles (rather than just one admin and one user), allowing for tailored access levels based on job functions (e.g., the key manager, log auditor, or network admin), with each identity then being further defined. This reduces the risk of unauthorized access to sensitive information, while still allowing multiple different users to access the HSM. This approach supports compliance with regulatory requirements by ensuring that access controls are aligned with organizational policies and can be audited effectively.

The management platform is another key asset. It offers the possibility to see the whole lifecycle of the HSM (e.g., every firmware update, all the features available, the virtualization capabilities, setting their security policies, etc.), available through a highly automated Graphical User Interface (GUI). There is an SDK running under the hood, which the customer can use (and which Futurex also uses for its VirtuCrypt service). The management automation capabilities can help to orchestrate the provisioning, configuration, synchronization, and replication of virtual HSMs across the physical HSM. This replication/cloning ability also applies across multiple physical HSMs.

In terms of integrations and partner ecosystem, CryptoHub HSM integrates seamlessly with various cloud services and on-premises deployments, enabling easy management and automation of cryptographic operations. VirtuCrypt enables elastic scaling, allowing customers to provision HSMs on demand, providing a flexible solution for payment services beyond what an HSM appliance can offer (even with virtualization capabilities). The service also supports both general-purpose HSM functionalities (e.g., KM), catering to diverse customer needs, thanks to the converged nature of the underlying hardware.

INNOVATION

FUTUREX

INNOVATION SCORE: 87.5

The VirtuCrypt service has been a significant growth pillar for Futurex. Because the service model supports elasticity, customers can scale their HSM resources up or down based on demand, enhancing operational efficiency. Futurex's VirtuCrypt has become a preferred choice among the company's various offerings, especially with large enterprises, banks, and credit card processors, due to its flexibility.

A unique part of the VirtuCrypt offering is the inclusion of complementary managed key services, providing organizations with expert KM support, as well as ensuring compliance with industry standards and regulations (the KM service is included in PCI audits). Futurex's decision to include KM as part of its service offering is in response to the changing ways in which its customers are making use of KM for payment applications (e.g., using PKCS #11 to hook into the HSM for 3-D Secure (3DS) applications). The service allows customers to offload KM responsibilities that are associated with payment applications, reducing operational overhead that does not require the use of a separate general-purpose HSM. Managed key services are a popular feature of Futurex's offering, with a large majority of its customers opting to use it (as opposed to bringing their own keys).

Futurex offers native integration with workloads running in AWS, Azure, and Google Cloud with its cloud service. Equally, CSPs are leveraging Futurex's hardware to enhance their own service offerings, allowing them to provide robust payment HSM solutions without developing their own technology from scratch, as in the case of AWS with its Payment Cryptography Service. The converged hardware makes it attractive for CSPs targeting diverse market needs. The collaboration enables CSPs to focus on their core services, while relying on Futurex for specialized HSM capabilities, particularly in payment applications, secure KM, and compliance with industry standards.

Finally, from a quantum-safe perspective, Futurex is one of the few HSM vendors to offer full PQC support (ML-KEM, ML-DSA, SLH-DSA) for cryptographic applications and as a root of trust in its own hardware for HSM connectivity (TLS 1.3 ed25519 with Kyber) and software/firmware updates.

IMPLEMENTATION

FUTUREX

IMPLEMENTATION SCORE: 83.6

Futurex offers a broad choice of form factors and services for the payment HSM market. In terms of hardware, its latest HSM platform is the CryptoHub HSM (formerly the Excrypt SSP Enterprise v.2), a converged payment and general-purpose network-attached appliance. Futurex also offers a PCIe card, the GSP3000 Cryptographic Module, which is used in the CryptoHub HSM, as a separate product offering, as well as in the AWS Payment Cryptography service.

In terms of service offering, Futurex proposes a cloud HSM known as VirtuCrypt, which has been available since 2015, and can be consumed either as a managed offering (bare metal) or as an HSMaaS (Payment Cryptography-as-a-Service). Further, Futurex offers native integration with workloads running inside CSPs such as AWS, Google, or Azure. Further, Futurex HSM services can be purchased through the various CSP marketplaces.

The offerings can cater to all payment HSM applications, and cover a broad range of cryptographic algorithms, including many regional and local payment-specific ones. The HSM is both PCI PTS HSM (v3) and FIPS 140-2 Level 3 certified.

CryptoHub HSM offers a flexible commercial model that allows for both OPEX and traditional Capital Expenditure (CAPEX) purchasing options, providing flexibility based on the customer's financial strategies and operational needs. One key advantage is that they can also adopt an OPEX-based financial model for on-premises deployments, enabling them to spread costs over time, rather than making a large upfront investment. This approach helps mitigate the financial impact of hardware upgrades and lifecycle changes, allowing for smoother budget management. The success of the VirtuCrypt service offering is what brought this to bear for its hardware offering, and Futurex has managed to copy this model successfully for on-premises use cases.

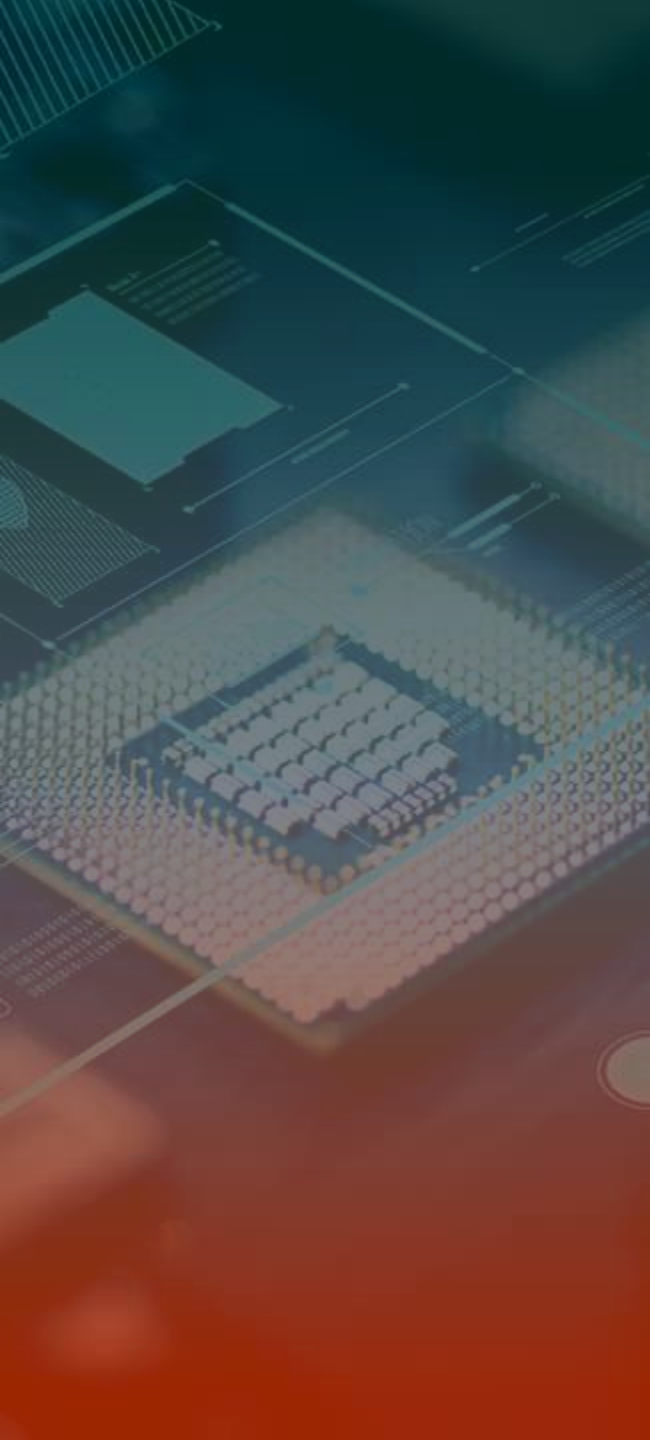
While traditionally a smaller payment HSM player out of the United States, in recent years, Futurex has successfully established a significant presence in key international markets to enhance its global footprint, with offices opened in the United Kingdom, Brazil, Mexico, and India to cater to the growing demand for secure payment solutions in those regions. In India specifically, Futurex opened data centers to address local data residency requirements and reduce latency for customers in the region. Further data centers in Australia and Singapore have been set up to enhance service availability and support customers in the broader Asia-Pacific region, ensuring low-latency access to cloud services. In Europe, Futurex opened two data centers to cater to the growing demand for secure and compliant data storage solutions in line with European Union (EU) regulations and directives, and uptake from a payment perspective has been strong. Finally, Futurex has further plans to open data centers in the Middle East and South Africa to facilitate market entry and growth there that will also address data residency requirements.

CONCLUDING REMARKS

With a broad range of available form factors, deployment offerings, and business models, Futurex has maximized the reach of its technology to enable usage to a wide range of different scenarios: on-premises, managed service, cloud instance, third-party integration, etc. Rather than fearing potential cannibalization from new service and platform models, it has embraced partnerships and hardware integrations.

In large part, this is because it provides excellent differentiation in its architectural design and management capabilities, focusing on opening up the platform to the customer in unique ways, with SDKs, expanded user access, and robust virtualization, among other features. Its VirtuCrypt service is a mature and complementary offering, which has proven highly popular with its existing customer base. Interest in the service has been a key driver for Futurex's international expansion, which it is undertaking in leaps and bounds, but with considered deployment that pays careful attention to regional requirements. Futurex's innovation and dedicated focus on these key fronts has propelled it as a leader in the payment HSM market.

CRITERIA AND METHODOLOGY



VENDOR MATRIX

Methodology: After individual scores are established for innovation and implementation, an overall company score is established using the Root Mean Square (RMS) method:

$$Score = \sqrt{\frac{innovation^2 + implementation^2}{2}}$$

The resulting overall scores are then ranked and used for percentile comparisons.

The RMS method, in comparison with a straight summation or average of individual innovation and implementation values, rewards companies for standout performances.

For example, using this method, a company with an innovation score of nine and an implementation score of one would score considerably higher than a company with a score of five in both areas, despite the mean score being the same. ABI Research believes that this is appropriate as the goal of these matrices is to highlight those companies that stand out from the others.

RANKING CRITERIA

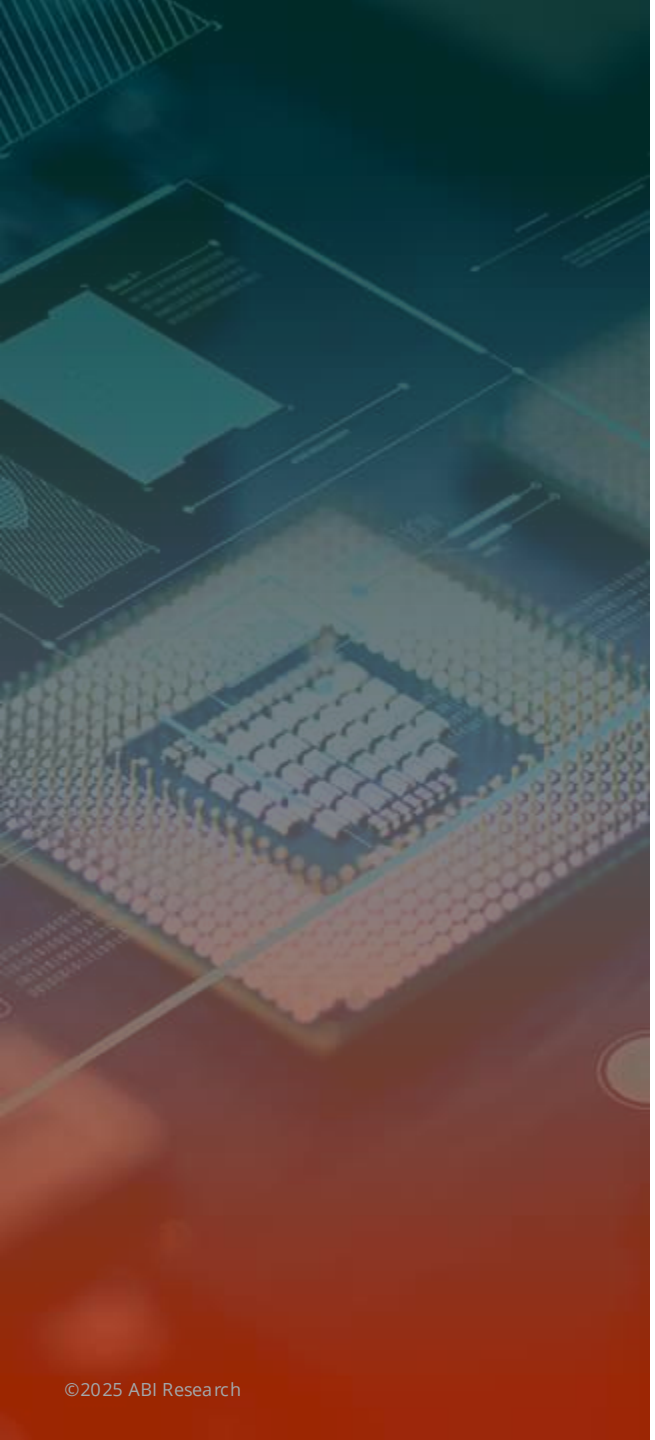
Leader: A company that receives a score of **75 or above** for its overall ranking.

Mainstream: A company that receives scores **between 60 and 75** for its overall ranking.

Follower: A company that receives a score of **60 or below** for its overall ranking.

Innovation Leader: A company that receives a score of **75 or above** for its innovation ranking.

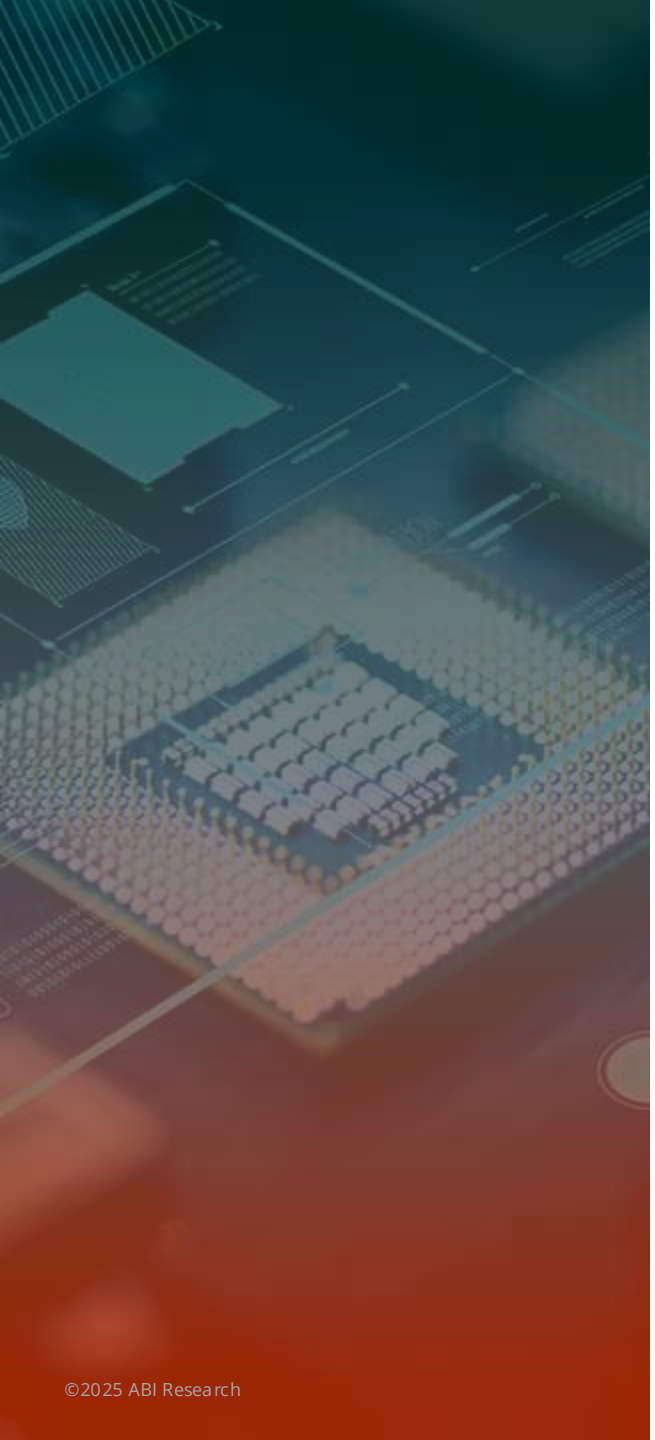
Implementation Leader: A company that receives a score of **75 or above** for its implementation ranking.



INNOVATION CRITERIA

The innovation criteria take into account novel capabilities in technology development and deployment, as well as in commercialization.

- **Configuration & Capabilities:** Capacity, performance, software/firmware, multi-tenancy, secure execution environments, physical security, logical security, and support.
- **Service Options:** Deployment models, features (monitoring capabilities, on-demand provisioning, autoscaling, in-field performance upgrade, etc.).
- **Partner Ecosystem:** Integration capabilities for third-party KM, payment solutions, data protection, financial institutions, e-commerce solutions, cloud services, HSM providers, and cards.
- **Management Platform:** Key Management (KM), remote management, 24x7 access, number of HSMs, real-time monitoring, automated sync, etc.
- **Quantum-Safe Capabilities:** Post-Quantum Cryptography (PQC) algorithms supported, Post-Quantum (PQ) root of trust.



IMPLEMENTATION CRITERIA

These criteria relate to the breadth of solutions, features, and capabilities of payment HSM offerings in order to assess their completeness and fitness for purpose.

- **HSM Solutions:** Breadth of choice, e.g., network-attached appliance, Peripheral Component Interconnect Express (PCIe) card, managed HSM (bare metal), HSM-as-a-Service (HSMaaS).
- **Applications:** Applicable to payment and card preparation, provisioning, authorization, verification, validation, transaction, processing, etc.
- **Cryptographic Algorithms:** Supported algorithms, including classical, payment, and protocols.
- **Standards & Regulation Compliance:** Payment Card Industry (PCI), Federal Information Processing Standards (FIPS), and other industry standards.
- **Go-to-Market:** Sales model, channel partners, white labeling, online evaluation, integration testing, etc.

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