FROST & SULLIVAN

2024 COMPETITIVE STRATEGY LEADER

IN THE GLOBAL POST-QUANTUM CRYPTOGRAPHY INDUSTRY

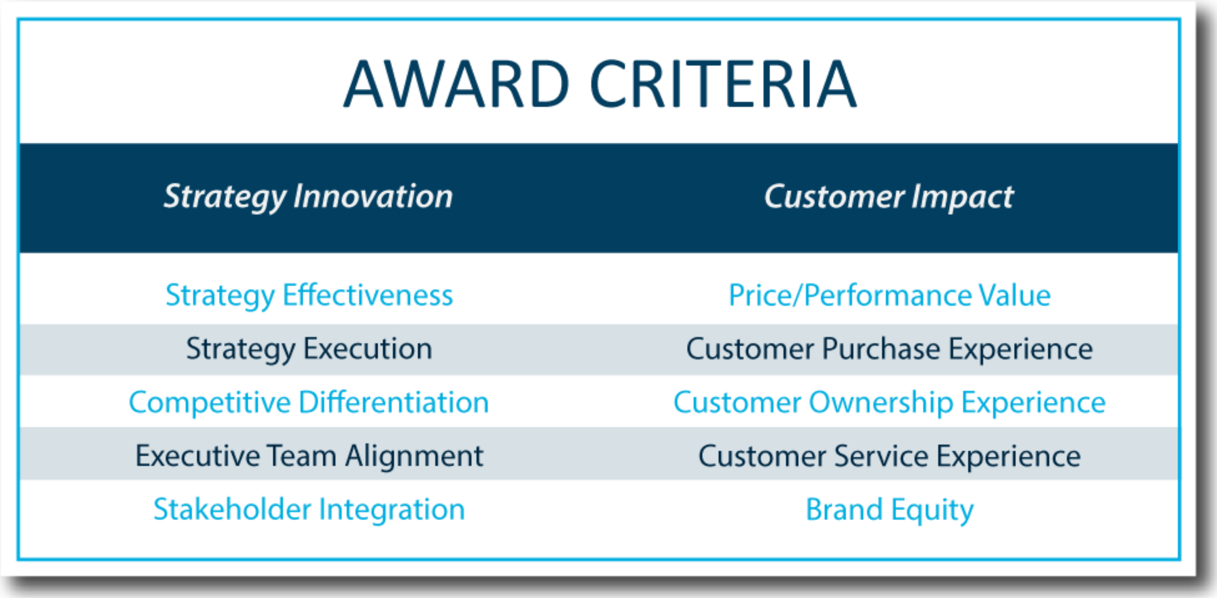
utimaco®

FROST & SULLIVAN

2024 BEST PRACTICES AWARD

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Utimaco excels in many of the criteria in the post-quantum cryptography space.



AWARD CRITERIA

Strategy Innovation	*Customer Impact*
Strategy Effectiveness	Price/Performance Value
Strategy Execution	Customer Purchase Experience
Competitive Differentiation	Customer Ownership Experience
Executive Team Alignment	Customer Service Experience
Stakeholder Integration	Brand Equity

A Paradigm Shift in Cryptography

By leveraging quantum mechanics, quantum computers offer the potential of a computational system that is many orders of magnitude greater than classical computers. Developments in quantum computing promise the ability to rapidly solve complex simulation and optimization problems, with a revolutionizing impact on a wide range of industries from biotechnology to financial services. This theoretical capability of performing calculations exponentially faster than traditional computers, however, also threatens the security of the public-key encryption in use today, which relies on the assumed mathematical difficulty of decomposing a large product back to its two prime factors.

The potential of quantum computers to break cryptographic protocols poses significant risks to data confidentiality, integrity, and authentication for organizations. Public-key cryptography is tightly engraved in most digital products and infrastructure used by enterprises, governments, and individuals for encryption, key establishment, and digital signatures. Going well beyond being merely an IT problem, vulnerabilities in cryptography endanger organizations' chains of trust. This has far-reaching implications, potentially leading to large-scale operational disruptions and compromise, as well as legal or reputational risks.

Starting in 2016, National Institute of Standards and Technology (NIST), has been leading the process of evaluating and standardizing post-quantum cryptography (PQC) algorithms. With final standards to be published in 2024, organizations in many industries have been testing the new algorithms in their environments against interoperability and performance challenges. The migration to quantum-resistant algorithms will be the largest-scale cryptographic migration to be carried out, requiring resources, investment, stakeholder cooperation, and technical expertise.

A Dependable Partner For a Monumental Task

Utimaco, founded in 1983 and with headquarters in Germany and California, is a leading global provider of on-premises and cloud-based payment and general purpose Hardware Security Modules (HSMs) acting as the central Root of Trust for any digital environment. Widely integrated in the market covering multiple layers of digital trust and cybersecurity, Utimaco's portfolio includes solutions for data protection, key management and secure payments, as well as telecommunication and public warning solutions.

Since 2020, Utimaco has been complementing its organic growth and offerings through a series of strategic acquisitions across the security ecosystem. In 2018, Utimaco acquired Atalla Product Line from Micro Focus to expand into US market and add Payment HSM and Enterprise key management to the existing General Purpose portfolio. Later in 2020, through the acquisition of key management solutions provider GEOBRIDGE for key management and MyHSM for as a service offering which is now known as Trust as a Service Marketplace, Utimaco substantially expanded its portfolio for the payments and financial industries. The following year, the company acquired exceet Secure Solutions (ESS) and REALSEC, further increasing its IT and IoT security footprint in Europe. In 2022, Utimaco acquired Celltick, a global leader in public warning and mass notification systems, and the world's largest cell broadcast center provider, expanding its comprehensive offering to government, telecommunications, and enterprise customers. With the acquisition of conpal in 2023, Utimaco fully integrated conpal's file and folder encryption solutions, thus completing its data protection portfolio.

Utimaco plays a key role in supplying the Root of Trust for a variety of industries and use cases, ranging from autonomous cars to hospitals and national critical infrastructure. In use cases such as providing the trust anchors for cloud service providers or border control infrastructure, digital trust established through Utimaco's offerings is extended to millions of end-users. Cross-cutting verticals, the company provides specialized offerings to manufacturers, governments, mobile network operators, banks, airports, and utilities, among others. Working on complex design and implementation projects with a diverse set of organizations with distinct security needs and requirements, Utimaco offers comprehensive and industry-specific expertise.

> *"Utimaco's expertise in deploying HSMs both for general purpose and specialized use cases translates well to the post-quantum era, which requires high levels of customization and adaptability. An integral part of the migration to PQC as a leading HSM supplier, Utimaco also strategically positions itself as a wide-ranging partner for organizations in this monumental task, providing consultancy services, quantum-readiness assessments, and crypto-agility solutions."*
>
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> ***Sr. Industry Analyst***

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Research Efforts Leading to an Early Mover Advantage

Placing a strategic focus on PQC to prepare the security infrastructure for the quantum era, Utimaco has been the first mover in developing PQC-ready HSMs. In 2019, through a technology partnership with ISARA, a leading provider of quantum-safe security solutions, Utimaco developed the application package Quantum Protect (former Q-safe) as extension for its General Purpose HSMs to enable the implementation of new and quantum-resistant algorithms. This paved the way for cybersecurity companies, IoT manufacturers, system integrators and other large organizations to test and integrate quantum-safe algorithms into their operations very early on and before the release of official standards.

In the same year, in collaboration with Microsoft and DigiCert, Utimaco was engaged in a research project for a quantum-resistant digital signature algorithm *Picnic.* Built on symmetric key primitives, post-quantum security measures, and a zero-knowledge proof system, the *Picnic* algorithm's test implementation was carried out on Utimaco HSMs. The agility and adaptability offered by Utimaco's product lines played a key role in these research efforts, preparing the company, its partners, and its clients for the migration to PQC.

Implementation, Support & Thought Leadership

Utimaco's Quantum Protect currently supports LMS, HSS, XMSS, XMSS-MT, Dilithium and Kyber algorithms, providing advanced functionalities and compliance needed to secure use cases against quantum threats without compromising on performance or usability. The PQC extension complements Utimaco's next generation u.trust General Purpose HSM Se-Series, which is designed crypto-agile and can be upgraded in-field with future algorithms or updated standards.

With the goal of making quantum-resistant algorithms accessible to clients in a reliable and future-proof way, Utimaco today has numerous real customer use cases enabled in the field, with complex implementations such as firmware signing for the automotive industry or protection of satellite communications. The company also carries out strategic initiatives by creating its own IP, like the state handler for LMS / XMSS and insourcing cryptography for more control and faster time to market. Testing its functional compliance with the NIST algorithms on a regular basis, Utimaco additionally has a strategy to be feature-complete and support individual algorithms selected by European and international security agencies.

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As part of its migration support to organizations, Utimaco's consultancy team works together with clients to map cryptographic inventories, perform risk assessments, and prepare PQC roadmaps, as well as offering professional services such as writing custom applications, libraries, and firmware modules to optimize performance. Complementing its capabilities in crypto-agility, Utimaco has partnered with cryptographic vulnerability management and agility solutions provider InfoSec Global to provide comprehensive discovery and inventory solutions, and to ensure it can react to changing algorithms and requirements in the future.

Building on its early research and collaboration efforts, Utimaco has been an active participant in PQC standardization and interoperability processes. The company took part in key committees and working groups, including the NIST PQC Consortium, X9 PQC Committee, ETSI Quantum-Safe Cryptography Working Group, PKI Consortium and the GSMA Association. In addition, Utimaco also leads industry and area-specific collaborative research projects on cryptoanalysis, network security and financial security, exploring the potential implications of PQC.

Conclusion

The transition from legacy algorithms to PQC and overcoming interoperability and performance challenges will be a monumental task, involving industry-specific requirements and adaptability. Utimaco's strategic positioning and expertise in a wide range of industries and applications put the company at a great advantage in migration to PQC. With its strong overall performance, Utimaco earns Frost & Sullivan's 2024 Global Competitive Strategy Leadership Award in the post-quantum cryptography industry.

What You Need to Know about the Competitive Strategy Leadership Recognition

Frost & Sullivan's Competitive Strategy Leadership Award recognizes the company with a stand-out approach to achieving top-line growth and a superior customer experience.

Best Practices Award Analysis

For the Competitive Strategy Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Strategy Innovation

Strategy Effectiveness: Effective strategy balances short-term performance needs with long-term aspirations and overall company vision

Strategy Execution: Company strategy utilizes Best Practices to support consistent and efficient processes

Competitive Differentiation: Solutions or products articulate and display unique competitive advantages

Executive Team Alignment: Executive team focuses on staying ahead of key competitors via a unified execution of its organization's mission, vision, and strategy

Stakeholder Integration: Company strategy reflects the needs or circumstances of all industry stakeholders, including competitors, customers, investors, and employees

Customer Impact

Price/Performance Value: Products or services provide the best value for the price compared to similar market offerings

Customer Purchase Experience: Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

Customer Ownership Experience: Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

Customer Service Experience: Customer service is accessible, fast, stress-free, and high quality

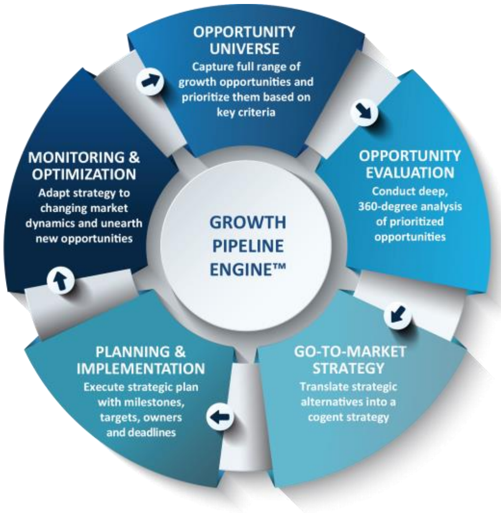
Brand Equity: Customers perceive the brand positively and exhibit high brand loyalty

About Frost & Sullivan

Frost & Sullivan is the Growth Pipeline Company™. We power our clients to a future shaped by growth. Our Growth Pipeline as a Service™ provides the CEO and the CEO's growth team with a continuous and rigorous platform of growth opportunities, ensuring long-term success. To achieve positive outcomes, our team leverages over 60 years of experience, coaching organizations of all types and sizes across 6 continents with our proven best practices. To power your Growth Pipeline future, visit Frost & Sullivan at http://www.frost.com.

The Growth Pipeline Engine™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.
Learn more.

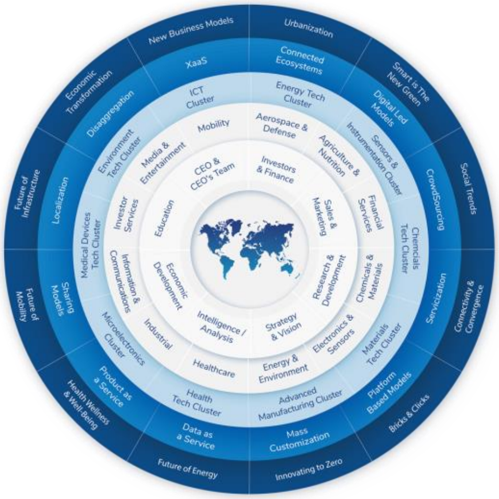

OPPORTUNITY UNIVERSE
Capture full range of growth opportunities and prioritize them based on key criteria
OPPORTUNITY EVALUATION
Conduct deep, 360-degree analysis of prioritized opportunities
GO-TO-MARKET STRATEGY
Translate strategic alternatives into a cogent strategy
PLANNING & IMPLEMENTATION
Execute strategic plan with milestones, targets, owners and deadlines
MONITORING & OPTIMIZATION
Adapt strategy to changing market dynamics and unearth new opportunities
GROWTH PIPELINE ENGINE™

Key Impacts:

- **Growth Pipeline:** Continuous Flow of Growth Opportunities
- **Growth Strategies:** *Proven Best Practices*
- **Innovation Culture:** *Optimized Customer Experience*
- **ROI & Margin:** *Implementation Excellence*
- **Transformational Growth:** *Industry Leadership*

The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.



Analytical Perspectives:

- ■ Mega Trend (MT)
- ■ Business Model (BM)
- ■ Technology (TE)
- □ Industries (IN)
- □ Customer (CU)
- ■ Geographies (GE)