

F R O S T & S U L L I V A N

FROST & SULLIVAN BEST PRACTICES AWARD

BIOMETRICS - GLOBAL

Company of the Year Award 2019



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Background and Company Performance

Industry Challenges

The digital economy and proliferation of innovative connected devices has dramatically changed the security landscape for today's businesses. Remarkable growth in electronic and mobile commerce across all industry verticals along with the introduction of IoT-based solutions influence not only how enterprises and organizations perform various functions, but also how they need to secure them. This goes from securing facilities, tracking and monitoring assets to managing customer relations. However, this new wave of technology brings heightened risks. More systems and more devices, whilst beneficial, also introduce more potential attack points. Information now travels rapidly around the digitized world, defying boundaries and breaking the traditional codes of security.

Both physical and cyber security are crucial to any business. Public and private organizations across all verticals require access control and authentication systems to secure multiple environments and devices within the organization and remotely. Compromised systems or facilities, whether maliciously or accidentally, pose a serious risk to consumers, businesses, and societies.

As technology evolves and becomes more sophisticated, so do the hacking techniques. Hackers use passive viruses to access passwords, PINs, names, birthdates, and other identification data. Furthermore, hackers install more aggressive viruses, such as ransomware, which leaves end-users feeling vulnerable, destroying consumer trust in breached companies. Organizations must employ more robust and comprehensive solutions to protect against cyberattacks.

Traditional legacy control systems often rely on personal identification numbers (PIN), or presentation of a proximity or magnetic stripe card, all of which are easy to steal, share, lose, or damage, adding significant risk, providing admission to the wrong people, and potentially creating a dangerous situation. While many organizations put significant efforts and budgets in deploying stronger cyber security measures, it is also critical for them not to neglect their physical security defenses.

To safeguard critical infrastructures and devices, public and private enterprises recognize the benefits of biometric authentication solutions; however, several organizations implement mediocre biometric technology or incorrectly deploy solutions, possibly creating suspicion and distrust of the technology. For example, several biometric identity solutions are incapable of keeping up with real-world applications, thus creating a frustrating and time-consuming experience for end-users. Even the strictest security measures are useless if they complicate usage. They must be convenient and user-friendly.

Frost & Sullivan independent analysis confirms IDEMIA provides industry-leading biometric solutions that competitors are unable to replicate, and the company's innovative culture ensures it will continue to be a global presence in the biometrics and security fields.

Visionary Innovation & Performance and Customer Impact of IDEMIA

Leveraging 40 years' experience in biometrics, IDEMIA, the global leader in Augmented Identity, provides a trusted environment enabling citizens and consumers alike to perform their daily critical activities (such as pay, connect and travel), in the physical as well as digital space. The company realizes that information travels through the digitized space, defying boundaries and crossing traditional lines of security. IDEMIA's expertise and its long-term interactions with the world's largest biometric users for law enforcement applications contribute to its fast and accurate biometric matching algorithms. With every technological disruption, the company adapts to meet the new and evolving security demands and delivers future-proofed innovation by investing in cutting-edge technologies, including Artificial Intelligence, cryptography, Cloud, innovative sensors and video analytics.

By standing for Augmented Identity, IDEMIA reinvents the identity concept, creating an identity that ensures privacy and trust and guarantees secure, authenticated and verifiable transactions. Realizing that a secure identity is the key to making a safer world, IDEMIA designs its market-leading solutions around biometric data (fingerprint, iris, facial), putting the user in direct control of their personal information.

Frost & Sullivan recognized IDEMIA with the 2015 North American Company of the Year Award in the fingerprint biometrics industry, as well as the 2017 Global Company of the Year Award in the biometric authentication solutions industry, and continues to be impressed by its innovations based on customer needs and market trends.

Industry-leading Biometric Solutions

Fingerprint Verification

IDEMIA delivers a fast and accurate access control solution through its MorphoWave™ Compact, wall-mounted, touchless fingerprint access and time & attendance terminal that extends security well beyond typical perimeters, enabling MorphoWave™ technology deployment in any location. This newest addition to IDEMIA's range of MorphoWave™ readers works seamlessly with the MorphoWave™ Tower previously launched by the company to deliver frictionless biometric access control in high traffic lobbies.

To gain access to specific locations, users wave their hand through the MorphoWave™ Compact, which scans four fingers using two different types of light to detect the three-dimensional (3D) shape and orientation of the fingers, as well as the finger ridges, obtaining more surface coverage and data than two-dimensional contact-based capture.

MorphoWave™ Compact can manage up to 40,000 users per device with a capacity of 1,000,000 logs in total. The reader's high speed, touchless acquisition capability allows users to remain in motion while being identified, guarantying high throughput.

IDEMIA anticipated early customer feedback regarding the award winning MorphoWave™ Tower from organization interested to leverage the technology beyond the lobby, at every door. Development started on the MorphoWave™ Compact prior to MorphoWave™ Tower's release. It was a complex process, as the company refused to sacrifice accuracy, speed, and performance for size. However, IDEMIA's rigorous stress testing paid off resulting in a complementary device that retains the MorphoWave™ Tower's large scanning volume in a significantly smaller package with an impressive False Acceptance Rate tunable down to 10^{-8} .¹ By reducing its size by 86% and weight by 93%, the MorphoWave™ Compact is ideal for wall-mounted access control.

IDEMIA extensively tested the MorphoWave™ Compact sensor technology, resulting in a leading lab and field-proven biometric technology. MorphoWave™ Compact is capable of scanning and verifying at a rate of over 45 people per minute with industry-leading accept/reject rates as verified in a recent National Institute of Standards and Technology (NIST) benchmark performed on its algorithms. Depending on a client's requirements and priorities, the technology can be customized to achieve the optimum balance of convenience and accuracy, while maintaining maximum throughput.

Moreover, MorphoWave™ core technology defies common biometric difficulties, such as environmental lighting. While competing biometric technologies suffer from light-sensitivity, rendering them inoperable under suboptimal lighting conditions related to location (indoors, outdoors, bright lights, complete darkness, and light changes throughout the day), IDEMIA engineered its technology to function fully in different lighting settings without requiring reconfiguration.

In cooperation with IDEMIA's channel partner network, MorphoWave™ Compact is tightly integrated with the majority of industry leading access control systems installed today. MorphoWave Compact therefore allows customers to strengthen their existing access control platforms and simultaneously increase their ROI on those existing systems, as they do not need to be changed to leverage the MorphoWave Compact.

Additionally, IDEMIA offers the Mobile Identity Multiplatform Suite (MIMS), software specifically designed for real-time operations in the field such as enrollment, eDocument checks, identification, criminal investigations and mobile access. This technology offers high efficiency, accuracy and reliability, and it functions across multiple operating systems and devices, including smartphones and tablets. It offers a set of applications:

¹ Frost & Sullivan Talks With IDEMIA. Interview. (Frost & Sullivan August 2018)

- MiScan facilitates the acquisition of all information relevant to complete an individual's registration, step-by-step and in a straightforward manner.
- MiCheck confirms the identity of an electronic document's holder.
- MiVerify provides quick one-to-many identification in the field from an on-site capture of individual's fingerprints or face (suspects, victims, travelers, attendees to sport or cultural events, etc.).
- MiAccess, running on IDEMIA's MorphoTablet 2, allows mobile workforce management with accurate biometric identification on the spot.
- MiCrimeScene helps speed up criminal investigations through field evidence collection with a mobile device in order to identify suspects directly from a crime scene.

This software suite ensures rapid and reliable processing, utilizing IDEMIA's exceptional biometric algorithm to provide unsurpassed accuracy. Moreover, the MIMs suite is customizable, so that customers can tailor the system to their specific needs.

Another innovation in the field of fingerprint technology is IDEMIA's F.Code smartcard with its integrated fingerprint sensor. The F.Code card is designed for biometric payment and cardholder authentication, leveraging existing banking, retail and network infrastructure. The technology allows users to authenticate themselves biometrically on the smartcard, ensuring transactions are performed only when card is used by its legitimate owner.

In 2018, the company collaborated with Télécom SudParis to design BioDigital, a new generation digital fingerprint reader that provides an effective defense against identity spoofing and achieves improved recognition of damaged surfaces, such as scarred or calloused fingers. Moreover, BioDigital is capable of providing safer and more effective matching with a success rate bordering on 100%.² The contactless technology recognizes the fingerprint and the subcutaneous print and sweat pore networks below. The device's optical coherence tomography produces 3D images from "echoes" of backscattered light, providing unmatched image reconstruction quality.

Facial Recognition

IDEMIA offers powerful facial recognition technology for law enforcement, government & commercial entities that need solutions beyond traditional video surveillance.

Until now, video surveillance has been used mostly as a reactive technology, as operator fatigue and overload does not ensure that it can reliably, repeatedly and proactively

² IDEMIA. *Télécom SudParis and IDEMIA present BioDigital, a new biometric technology to combat identity spoofing*. Press Release. (Accessed September 2018)

prevent issues from occurring. Additionally when it comes time to investigate what went wrong, it is often sometime after the event, and vague or limited leads often waste valuable time as investigators try to determine which cameras captured relevant information and during what time frame.

IDEMIA's Augmented Vision solution redefines the level of value that can be extracted from surveillance infrastructure. IDEMIA leverages live & recorded video from a wide variety of sources, as well as still images, and through powerful AI based algorithms, detects and tags massive amounts of valuable metadata.

This powerful intelligence layer extracts previously unattainable value from traditional surveillance and analytic platforms, and empowers investigators, analysts, security operators alike.

This solution offers a wide range of business logic including; real-time alerts such as watch list hits, VIP detection, object detection (car, bus motorcycle, train etc.), as well as important conditional logic for solving complex cases involving 2 or more individuals, whose mutual involvement in an incident needs to be determined over a large area or length of time. Such powerful tools literally save 100's and even thousands of manual hours per case.

For deeper forensic type investigations, the newly designed Face Expert uses an intuitive web-based interface offering ease-of-use and groundbreaking functions, such as an image enhancement tool that improves poor-quality images and adjusts non-frontal shots through 3D modeling. This ultimately improves accuracy as well as the production of reports on offenders, cases, and facial comparisons, saving the operator time and money.

The company also pioneers for mobile user authentication with 3D acquisition technologies, reflecting smartphone users' demand for simplification, efficiency, and security. IDEMIA's 3D Face solution takes the next step in smartphone biometric security, leveraging state-of-the-art Structure Light (SL) or Time of Flight (ToF) technologies to strengthen accuracy and achieve unmatched throughput and execution time (less than 100 milliseconds) in all lighting conditions, even in the darkness. Both SL and ToF collect a tremendous amount of "depth data" — the scope and dimensions of the user's face. The device can create a biometric template, combining the acquired data with a 2D infrared image. Furthermore, IDEMIA's spoof detection technology ensures a 2D photo, video or 3D mask cannot be used to "spoof" the system into allowing them to gain access. This technology can be used for device access — e.g., smartphones, tablets, and laptops — and secure processing such as e-banking and e-payment authorization solutions. With this solution, users can remotely and securely authenticate from their mobile devices, through FIDO, reaching the highest level of security.

Iris Recognition

IDEMIA's OneLook provides a non-intrusive, simple-to-use biometric capture device that can be integrated into existing customer touchpoints (such as a self-service kiosk) or used as a turnkey solution (for a boarding gate or service counter). This at-a-distance solution ensures a high level of accuracy while ensuring high throughput. Both iris and facial biometrics are captured in less than three seconds on average as people walk through the capture field. Embedded anti-spoofing technology uses auto-focus for iris capture and 3D video tracking for facial recognition.

IDEMIA showcased and received high praise for this innovative, multi-modal biometric solution at the 2018 Biometric Technology Rally, hosted by the Department of Homeland Security (DHS) and the Science and Technology Directorate (S&T). OneLook achieved the highest user satisfaction rating among face/iris stations with a 93% score, and it was the only system to obtain a less than 5% "failed to acquire face images" metric within 20 seconds.³ The device also ranked in the top three among all competing companies, demonstrating the simplicity of use, and it achieved the highest score among face/iris systems for the true identification rate of iris images within both 5 and 20-second testing scenarios. Separately, iris and facial recognition offer high levels of accuracy. OneLook's combination provides the highest level possible based on software algorithms proven to be the best in the world in independent tests. This technology has been successfully implemented at Changi Airport Terminal 4 and is praised around the world for offering a seamless and frictionless traveler experience.

Excellence through Innovation

Frost & Sullivan believes IDEMIA's commitment to innovative research and development (R&D), as well as its impressive portfolio of biometric solutions, positions the company as the leader in biometric solutions across all industries around the globe.

IDEMIA believes technology must not get in the way; it must be secure and convenient. Considering this, the company invests much of its R&D resources into its technology optimization, ensuring an optimum end-user experience without compromising performance. The quality balance is a crucial element of the company's R&D focus, and IDEMIA ensures ongoing quality through in-house R&D, development and manufacturing.

IDEMIA's technology overcomes difficulties where other biometric solutions falter, and the company excels at offering industry-leading anti-spoofing technology. All of the company's solutions come equipped with strict security controls, and IDEMIA regularly updates its software, employing stronger methods of protecting data including compliance with important standards such as GDPR.

³ IDEMIA. *IDEMIA excels in Department of Homeland Security Biometric Technology Rally with OneLook Face/Iris system*. Press Release. (Accessed September 2018)

Moreover, IDEMIA's seamless integration with other technologies allows customers to utilize two biometric scans, such as fingerprint with a face or iris scan. Rather than relying upon a serial processing path, in which the results from one biometric search go to another biometric modality, the architecture allows intelligent parallel processing in which all biometrics act simultaneously as part of an intelligent decision-making process.⁴ For example, IDEMIA's MorphoTablet™ 2i takes multimodal biometrics a step further. The mobile enrollment and authentication solution incorporates all three biometrics in one terminal: fingerprint, facial, and iris. The MorphoTablet™ 2i builds upon its predecessors, the MorphoTablet™ and MorphoTablet™ 2, with the addition of quick iris recognition. The biometric trifecta strengthens the device, achieving rapid, seamless digital enrollment while maintaining powerful fraud detection through its tripe-check verification process. The MorphoTablet™ 2i's speed and user-friendliness of the iris functionality make it an ideal choice for large-scale programs requiring massive enrollment, authentication, and identification.

Lastly, IDEMIA's technology complies with and upholds important local and global security standards and regulations in spaces such as government, profile security, and legacy to future technologies for interoperability. IDEMIA's fingerprint, face and iris algorithms consistently rank in the top three in numerous benchmarks performed by NIST, and its key fingerprint sensor offerings received the FBI certification for meeting Personal Identity Verification and Image Quality Specifications standards. Additionally, many IDEMIA products include proximity, DESFire, & iClass cards, to support standards for two-factor verification, and it meets other standards, such as industry standard open protocol and PLAI, and data protection standards like GDPR & OSDP. Strong data security standards are also supported, including; Secure Sockets Layer, Transport Layer Security & AES 256.

Empowering Customers through Exceptional Value and Service

IDEMIA supports its channel partners through the entire sales and product lifecycle. The company provides on-site engineering support for larger projects while offering extensive training on its devices. In doing so, IDEMIA creates awareness and understanding of how the technology operates and what to pursue. It actively engages with its clients, advising them on product selections and utilization, and encouraging them to trial its solutions so they can see them at work in real-world applications. These trial periods allow IDEMIA and a client to work through tuning or even customizing the product for a specific environment, ensuring the client's confidence and overall satisfaction with the purchase.

IDEMIA works alongside its clients in creating biometric solutions tailored to their business needs. The company facilitates strong ownership experience through its software development kits, which empower partners to facilitate their success. MorphoManager by IDEMIA, for example, is a fully integrated enrollment software package that works "out of the box" across many devices, providing a single biometric solution that facilitates capture

⁴ IDEMIA. *Multimodal Biometric Recognition*. Press Release. (Accessed September 2018)

and enrollment on the same application whilst offering simultaneous compatibility with more than 20 of industries leading access control systems. MorphoKit™ provides access to powerful SDK tools, allowing software developers to integrate a variety of biometric features and build custom workflows based on three highly accurate biometric modalities. Frost & Sullivan believes this personalized touch promotes ongoing customer loyalty, as well as encourages new customers to engage with the company. Understanding client needs and requirements is one of the pillars of IDEMIA's customer service philosophy. Considering this approach, the company maintains support and repair centers around the globe to reinforce customer confidence in the company and products.

Finally, IDEMIA provides regular software updates throughout the lifecycle of deployment. The company's price and performance value supersedes the competition because its solutions improve over time with each update, e.g., algorithm enhancements and innovative features. Moreover, IDEMIA consistently receives positive feedback regarding its customer engagement efforts and empowering solutions, and consistently achieves major industry awards for its products confirming IDEMIA's key role in shaping the biometric industry.

Conclusion

Although biometric scanner prevalence increases every month, inferior technology and incorrect deployment hinder truly widespread adoption. IDEMIA's groundbreaking biometric technology and powerful algorithms defend against biometric spoof attacks and cyber related threats, ensuring data protection for the public and private sector. IDEMIA's robust portfolio of high-end solutions and services provide strong value to customers, leveraging multimodal technology to empower its partners and users to deliver biometric identification services in a new and different way. The company consults clients on biometric technology as a whole, offers training in its solutions, and offers unmatched customer support.

With its industry-leading technology, unrivaled customer support, next-generation innovations, and superior overall performance, Frost & Sullivan is honored to present IDEMIA with the 2019 Global Company of the Year Award for its biometric solutions.

Significance of Company of the Year

To receive the Company of the Year Award (i.e., to be recognized as a leader not only in your industry, but among your non-industry peers as well) requires a company to demonstrate excellence in growth, innovation, and leadership. This kind of excellence typically translates into superior performance in three key areas: demand generation, brand development, and competitive positioning. These areas serve as the foundation of a company's future success and prepare it to deliver on the two criteria that define the Company of the Year Award (Visionary Innovation & Performance and Customer Impact).



Understanding Company of the Year

As discussed above, driving demand, brand strength, and competitive differentiation all play a critical role in delivering unique value to customers. This three-fold focus, however, must ideally be complemented by an equally rigorous focus on Visionary Innovation & Performance to enhance Customer Impact.

Key Benchmarking Criteria

For the Company of the Year Award, Frost & Sullivan analysts independently evaluated two key factors—Visionary Innovation & Performance and Customer Impact—according to the criteria identified below.

Visionary Innovation & Performance

- Criterion 1: Addressing Unmet Needs
- Criterion 2: Visionary Scenarios through Mega Trends
- Criterion 3: Implementation Best Practices
- Criterion 4: Blue Ocean Strategy
- Criterion 5: Financial Performance

Customer Impact

- Criterion 1: Price/Performance Value
- Criterion 2: Customer Purchase Experience
- Criterion 3: Customer Ownership Experience
- Criterion 4: Customer Service Experience
- Criterion 5: Brand Equity

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 Monitor, target, and screen	Identify Award recipient candidates from around the globe	<ul style="list-style-type: none"> Conduct in-depth industry research Identify emerging sectors Scan multiple geographies 	Pipeline of candidates who potentially meet all best-practice criteria
2 Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> Interview thought leaders and industry practitioners Assess candidates' fit with best-practice criteria Rank all candidates 	Matrix positioning of all candidates' performance relative to one another
3 Invite thought leadership in best practices	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> Confirm best-practice criteria Examine eligibility of all candidates Identify any information gaps 	Detailed profiles of all ranked candidates
4 Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> Brainstorm ranking options Invite multiple perspectives on candidates' performance Update candidate profiles 	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> Share findings Strengthen cases for candidate eligibility Prioritize candidates 	Refined list of prioritized Award candidates
6 Conduct global industry review	Build consensus on Award candidates' eligibility	<ul style="list-style-type: none"> Hold global team meeting to review all candidates Pressure-test fit with criteria Confirm inclusion of all eligible candidates 	Final list of eligible Award candidates, representing success stories worldwide
7 Perform quality check	Develop official Award consideration materials	<ul style="list-style-type: none"> Perform final performance benchmarking activities Write nominations Perform quality review 	High-quality, accurate, and creative presentation of nominees' successes
8 Reconnect with panel of industry experts	Finalize the selection of the best-practice Award recipient	<ul style="list-style-type: none"> Review analysis with panel Build consensus Select winner 	Decision on which company performs best against all best-practice criteria
9 Communicate recognition	Inform Award recipient of Award recognition	<ul style="list-style-type: none"> Present Award to the CEO Inspire the organization for continued success Celebrate the recipient's performance 	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 Take strategic action	Upon licensing, company able to share Award news with stakeholders and customers	<ul style="list-style-type: none"> Coordinate media outreach Design a marketing plan Assess Award's role in future strategic planning 	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS



About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation, and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.