



2013 Global Smart Card Personalization Solutions
New Product Innovation Leadership Award



FROST & SULLIVAN



50 Years of Growth, Innovation & Leadership

New Product Innovation Leadership Award Smart Card Personalization Solutions Global, 2013

Frost & Sullivan's Global Research Platform

Frost & Sullivan is in its 50th year in business with a global research organization of 1,800 analysts and consultants who monitor more than 300 industries and 250,000 companies. The company's research philosophy originates with the CEO's 360-Degree Perspective™, which serves as the foundation of its TEAM Research™ methodology. This unique approach enables us to determine how best-in-class companies worldwide manage growth, innovation and leadership. Based on the findings of this Best Practices research, Frost & Sullivan is proud to present the 2013 Global New Product Innovation Leadership Award in Smart Card Personalization Solutions to Infineon Technologies AG (Infineon).

Significance of the New Product Innovation Leadership Award

Key Industry Challenges Addressed by Superior Product Innovations

The smart cards industry – also known as the digital identification industry – was heavily impacted by the economic crisis. As a consequence, many providers report to Frost & Sullivan that they decided to increasingly focus on specific strategies to reduce costs and optimize cost efficiencies. The global economy needed to face a series of challenges raised by a wave of globalization over the past decade. Banks and financial institutions were also affected by the crisis, and were forced to rethink their product and service deployment and pricing strategies.

Frost & Sullivan notes that these factors have required the digital identification industry to propose products that perfectly fit customers' needs and cost requirements. Contactless cards for contactless payment, or identity management, are an ideal solution to help create new customer experiences. Contactless cards can be characterized as pure contactless, dual interface, or hybrid. While a dual interface card has a single chip with both contactless and contact functionalities, hybrid cards have two chips (one for contactless and the other for contact interaction).

Although it is quite obvious that card manufacturers should provide a highly reliable product, Frost & Sullivan feels that they must also ensure that their solutions are cost effective. The additional manufacturing costs of dual interface cards cannot be entirely passed on to financial institutions, as this may act to limit the adoption of contactless technologies. Smart card manufacturers should carefully assess the solutions open to them in order to guarantee scalable and consistent manufacturing processes.

Key Benchmarking Criteria for New Product Innovation Leadership Award

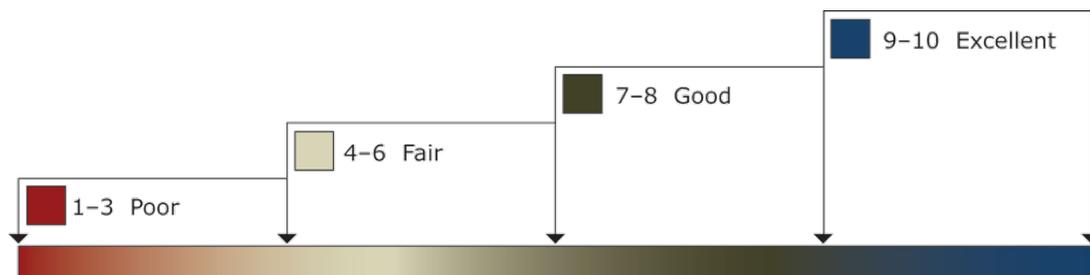
For the New Product Innovation Leadership Award, the following criteria were used to benchmark Infineon's performance against key competitors:

- Innovative Element of the Product
- Leverage of Leading-Edge Technologies in Product
- Value Added Features/Benefits
- Increased Customer ROI
- Customer Acquisition/Penetration Potential

Decision Support Matrix and Measurement Criteria

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Matrix (DSM). The DSM is an analytical tool that compares companies' performance relative to each other with an integration of quantitative and qualitative metrics. The DSM features criteria unique to each Award category and ranks importance by assigning weights to each criterion. The relative weighting reflects current market conditions and illustrates the associated importance of each criterion according to Frost & Sullivan. Fundamentally, each DSM is distinct for each market and Award category. The DSM allows our research and consulting teams to objectively analyze each company's performance on each criterion relative to its top competitors and assign performance ratings on that basis. The DSM follows a 10-point scale that allows for nuances in performance evaluation.

Performance-Based Ratings for Decision Support Matrix



This exercise encompasses all criteria, leading to a weighted average ranking of each company. Researchers can then easily identify the company with the highest ranking. As a final step, the research team confirms the veracity of the model by ensuring that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

Frost & Sullivan’s 10-Step Process for Identifying Award Recipients



Best Practice Award Analysis for Infineon Technologies AG

The Decision Support Matrix illustrates the relative importance of each criterion for the New Product Innovation Award and the ratings for each company under evaluation. To remain unbiased while also protecting the interests of the other organizations reviewed, we have chosen to refer to the other key players as Competitor 1 and Competitor 2.

Decision Support Matrix for New Product Innovation Award

<i>Measurement of 1–10 (1 = lowest; 10 = highest)</i>	Award Criteria					
	Innovative Element of the Product	Leverage of Leading-Edge Technologies in Product	Value Added Features/Benefits	Increased Customer ROI	Customer Acquisition/Penetration Potential	Weighted Rating
Relative Weight (%)	20%	20%	20%	20%	20%	100%
Infineon’s “Coil on Module” Solution	9.0	7.0	9.0	9.0	8.0	8.4
Competitor 1	8.0	7.0	7.0	7.0	8.0	7.4
Competitor 2	7.0	6.0	6.0	8.0	6.0	6.6

Criterion 1: Innovative Element of the Product

For a standard dual interface, the connection between the embedded antenna and the chip is the most critical part of the assembly. Most of the time, this connection is a physical connection (soldering connections, for example).

At the beginning of 2013, Infineon announced a new solution for contactless card personalization. This solution included a security chip and an antenna embedded on the plastic card. To overcome potential difficulties (such as damaged antenna, lack of contact between module and antenna) during the personalization of a dual interface card, Infineon uses radio frequency (RF) technology for this connectivity. This innovative solution improves the reliability of the contactless card and vastly improves the robustness of the final product.

Competitor 1 is using a similar approach, but the selected product uses wire bonding instead of Flip Chip Technology and specific antennas. Competitor 2 employs traditional contactless card assembly, which puts the company at a significant disadvantage in the contactless card industry.

Criterion 2: Leverage of Leading-Edge Technologies in Product

Infineon is a leading manufacturer of semiconductor solutions, which has enabled it to gain deeper expertise of manufacturing processes and, subsequently, how to improve technologies. Based on this experience, and on customer feedback regarding ways to ameliorate the quality of the assembly process, the company has nicely developed a complete solution based on leading-edge technologies such as new chip modules.

Competitor 1 attempted this a year prior, but its product portfolio is certainly less comprehensive than Infineon's. Competitor 2 did not develop a specific assembly methodology and continues to use a traditional assembly approach.

Criterion 3: Value Added Features/Benefits

Frost & Sullivan independent analysis confirms that Infineon's product addresses numerous challenges. The first is reliability: traditional contactless assembly technologies are difficult to deploy, as the way to connect the antenna to the module generates a lot of rejected cards (due to low quality standards); as a result, production capacity is constrained. The second challenge is product lifecycle: by using an RF solution instead of a physical connection, the mechanical constraints have less of an impact on the contactless card performance. This approach offers true added value for ID cards, as the cards are expected to offer a lifetime of around 10 years. The last one is flexibility. Clients can select modules from the Infineon portfolio and associated antenna without specific adaptation.

Competitor 1's offering suffers from lower performance, as its product uses wire bonding, instead of Flip Chip technology, which normally provides better device performance.

Competitor 2 does not offer value added features, except for the fact that its solution needs a low initial investment to fit newer manufacturing quality and process requirements.

Criterion 4: Increased Customer ROI

Frost & Sullivan firmly believes that Infineon's solution is perfectly aligned to customer needs for increased, and clearer, ROI. Infineon proposes a list of antennas that do not require adaptation for use with respective modules. This simplified assembly solution increases manufacturing yield and, as a result, decreases manufacturing costs. As such, the production process is accelerated, and ROI for customers is maximized. The number of rejected cards is minimized, and the lifetime of the final product is increased. As all Infineon modules can be used with relevant antennas, the price of the final card product can be adjusted to suit customer requirements.

Competitor 1 uses a proprietary solution that does not allow clients to obtain optimized prices. In addition, the product range, compared to Infineon, is quite limited; as a result, cost efficiency is negatively impacted. Competitor 2's solution has generated many rejected final products and produced contactless cards that offer lower lifetime.

Criterion 5: Customer Acquisition/Penetration Potential

The contactless card market – and, more specifically, dual interface card solutions – has already started to skyrocket. The dual interface card market is expected to grow in terms of shipments at a CAGR (2013-2017) of 22.7% (per Frost & Sullivan independent analysis). The explosion of contactless payment cards and the need for governments to use contactless cards for identity management are driving the market. Few players are able to provide a solution to enable easily personalization of contactless cards. Frost & Sullivan is of the opinion that Infineon is, however, perfectly aligned with industry demand and timeframes. Global contactless card adoption is rapidly increasing, with many customers (banks, financial institutions, national agencies, cards manufacturers) already looking for efficient assembly solutions.

As the offering from Competitor 1 is a proprietary solution, many potential customers are not selecting this offer to avoid possible pricing or patent issues. At the moment, Competitor 2 is not able to address the market with such innovative solutions as Infineon.

Conclusion

Frost & Sullivan confers the 2013 Global New Product Innovation Leadership Award to Infineon, due to the company's outstanding understanding of the contactless cards manufacturing space. Infineon has developed a flexible solution that does not require major investments from a manufacturing point of view. This product innovation allows card manufacturers, banks and financial institutions to increase their production yield, along with the performance and lifetime of the final products. Infineon's modules, chips and antenna

portfolio in contactless technologies have a proven track record of success in addressing the dual interface market. The selected Flip Chip technology, coupled with a RF link (rather than the traditional physical link), is a product innovation that perfectly responds to industry challenges.

About Frost & Sullivan

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