FROST & SULLIVAN

INFOBIONIC®

2019 North American Remote Cardiac Monitoring Technology Leadership Award

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2019

BEST
PRACTICES
AWARD

NORTH AMERICAN
REMOTE CARDIAC MONITORING
TECHNOLOGY LEADERSHIP AWARD

2018

BEST PRACTICES

AWARDS

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According to US Centers for Disease Control and Prevention (CDC), 11.5% of American adults have been diagnosed with a heart disease. As a family, heart disease results in 197 deaths per 100,000 persons, making it the leading cause of death in the country. A key member of this family is cardiac arrhythmia, which is characterized by irregular electrical activity in the heart that causes it to beat too rapidly, too slowly, or erratically. An unusually fast rhythm (above 100 beats per minute) is called tachycardia, and a heart rate that is too slow (less than 60 beats per minute) is called bradycardia. Arrhythmias pose the risk of developing into serious conditions such as stroke, heart failure, or cardiac arrest. Clinical studies, including one published recently by Alan Go *et al* in the Journal of the American Medical Association (JAMA) Cardiology, advocate the practice of continuous cardiac monitoring as a means to detect arrhythmia early on and to prevent risks of stroke and heart failure.

In this context, the cardiac monitoring industry offers several types of monitors that enable remote and continuous monitoring through electrocardiography (ECG). The first is the widely adopted Holter monitor, a battery-operated, portable device that a patient wears to record the heart's electrical activity for up to two weeks to screen for cardiac events. The challenge with these traditionally used ambulatory heart monitors is that they are not capable of real-time analysis; the data is reviewed days or weeks after it has been collected. In addition, Holter monitors are considered to be cumbersome and uncomfortable for the patient due to the presence of patches and wires. A second type of cardiac monitor, an event monitor, provides a more timely analysis of cardiac data, but the patient initiates recording when experiencing symptoms; therefore, the recording is not continuous. Moreover, the recorder constantly overwrites previous data, which means retaining heart data over time becomes a major issue. Finally, mobile cardiac telemetry (MCT) units provide continuous measurements of cardiac activity and include an automatic arrhythmia detector. But the challenge with this device lies in automatic ECG analysis since this requires vast computational resources and electrical power.

The key takeaway from reviewing the solutions available in the market is that they provide a great value addition. At the same time, though, the dependence on one device alone is likely to result in incomplete cardiac monitoring. Another challenge in the remote monitoring industry is siloed information that directly affects timely diagnosis and treatment, and thus poses a potential danger for patients with a history of heart disease.

The need of the hour is a cardiac monitor that would integrate the positive attributes of the various form factors, while also keeping in mind evolving healthcare trends and patients' increasing comfort with the digital space. Such a monitor would put the patient at the center of the digital ecosystem, non-intrusively recording, storing, and analyzing cardiac activity—virtually bringing the patient closer to the physician.

Technology Leverage and Business Impact

InfoBionic, a digital health company based in Boston, designed and developed MoMe® Kardia, introduced as the only full disclosure transmitter in the market. As an answer to the key unmet needs of the cardiac monitoring market, MoMe Kardia captures clinical-grade ECG, providing near real-time and continuous cardiac monitoring.

Commitment to Creativity

The MoMe Kardia system seamlessly integrates the three monitoring modes—Holter, cardiac event monitoring, and MCT—into a single, non-invasive cardiac monitor. Built into a lightweight wearable form factor, MoMe Kardia allows physicians to gather cardiac data during the monitoring period. Physicians can remotely switch between the three diagnostic modes, empowering them to gather data needed to make an effective diagnosis.

Unlike other products that usually have a sensor unit to acquire ECG data and another unit to transmit the captured data to the monitoring center, MoMe Kardia allows both tasks to be accomplished via a single device. Frost & Sullivan believes that a key feature of the product is that it does not require patient intervention to capture or record data; therefore, the transfer from ECG recording to storage is continuous. The device is sleek and lightweight, allowing patients to go about their daily routine without interference from the monitor. The comfort and convenience that the device offers translates into usage over long periods of time.

At a time when consumer electronic products, renowned for elegant product design, are offering health monitoring, it becomes incumbent upon clinical-oriented diagnostic devices to also focus on product design. Traditionally, this aspect of product development has been overlooked, placing utility over comfort. Frost & Sullivan commends InfoBionic for a product design that has focused on patient comfort just as much as on physician expediency.

Commitment to Innovation

A persistent industry challenge has been data storage, management, and analysis. MoMe Kardia confronts this challenge head-on with innovative product features supplementing a novel business model. On the product side, the monitoring unit has enough power to continuously stream to the cloud. It delivers data directly from the cloud to the physician's smartphone via a secure app that is Health Insurance Portability and Accountability Act (HIPAA) compliant.

A few other product features truly showcase the value offering:

- MoMe Kardia enables precision analysis by verifying detected events through a proprietary algorithm to reduce false positives.

- The physician can conveniently gain access to monitoring data any time of the day, and remotely switch between modes as needed.

- The physician has access to all data at any given point of time and uniquely has full ownership of the entire service. Full data disclosure sets MoMe Kardia apart from

market competition; all other devices share only event triggers with the patient. Full data has to be requested, and even then may take time to receive. By giving physicians complete access to patients' health data, InfoBionic empowers them with true 24x7 monitoring and faster intervention.

Technology Incubation and Commercialization Success

In early 2016, InfoBionic received clearance from the US Food and Drug Administration to market the MoMe Kardia system as an aid to physicians in their diagnosis of cardiac arrhythmias. Within two years, the device has gained considerable traction in the market: it has been used to diagnose and/or monitor more than 40,000 patients. InfoBionic witnessed a nearly 600% growth in new and recurring customers from 2016 to 2017 and continues this pace throughout 2018.

MoMe Kardia is positioned as the only deep learning software-as-a-service cardiac monitor. This makes cardiac care intelligent, scalable, and closely aligned with the growing cardiac monitoring needs. InfoBionic sells the devices to physicians for a one-time fee, and thereon, a monthly subscription fee is charged for the use of software that runs the data. The physician is then able to prescribe a single device to multiple patients, changing between different modes. Under InfoBionic's business model, a physician is able to use a single device for as many tests as needed, at a single monthly fee. If the same had been done using the three traditional devices, the costs would have been unpredictable and dependent on the scale of monitoring required, varying between $100 and $1,000 per month. Instead, the 3-in-1 MoMe Kardia device greatly reduces infrastructure costs and allows physicians to scale their monitoring abilities.

In September 2018, InfoBionic signed an exclusive distribution agreement with BIOTRONIK, INC., a global cardiac medical technology company that develops cardiovascular and endovascular solutions. This partnership gives the novel product marketing might and a market foothold that is needed to take on some of the larger and well-established cardiac diagnostic companies.

Customer Acquisition and Growth Potential

The MoMe Kardia system not only provides near real-time heart activity data, but also solves the problem of storing and retaining data. Moreover, the system's remote transition capability can eliminate the need for patient to visit a hospital; the physician can decide the treatment based on the arrhythmia detection relevance. This effectively replicates the practice of non-emergency in-hospital monitoring, making patients unencumbered while they are studied in their natural state of activity.

In the wake of increasing market adoption and successful product acceptance, InfoBionic raised $50 million in a new round of funding, bringing its total funding to $75 million. Frost & Sullivan believes that this funding round, viewed together with the BIOTRONIK partnership, significantly boosts the company's growth potential.

InfoBionic is now launching nationally with hundreds of representatives through its strategic partner. This is a part of the plan to increase its market presence from about 5

states at the beginning of 2018 to nationwide coverage by year end. Over the next 18 to 24 months, InfoBionic plans to expand into international territories, beginning with select markets in Europe and promising countries in Asia. With strong intentions for an international presence, InfoBionic's growth worldwide is imminent.

Conclusion

InfoBionic's MoMe Kardia system addresses the key issues and barriers in the remote cardiac monitoring industry. By leveraging technology effectively, InfoBionic has devised a system that caters to cardiac arrhythmia patients and their physicians by conveniently monitoring and diagnosing cardiac activity in as close to real time as possible. Patients and physicians are now equipped with greater control over heart monitoring for improved outcomes.

For its commendable technology leverage and remarkable overall performance, InfoBionic has earned Frost & Sullivan's 2018 Technology Leadership Award.

Significance of Technology Leadership

Technology-rich companies with strong commercialization strategies benefit from the increased demand for high-quality, technologically-innovative products. Those products help shape the brand, leading to a strong, differentiated market position.

- Acquire competitors' customers
- Generate awareness
- Increase market penetration
- Build a larger customer base
- Balance pricing with profitability

- Establish a strong brand identity
- Align the brand to the company's vision
- Inspire customers
- Push the envelope
- Build a reputation for innovation

DEMAND

BRAND

Technology Leadership

COMPETITIVE POSITIONING

- Establish a clear value proposition
- Deliver superior value to customers
- Be a leader in innovation
- Be a leader in technology development
- Stake out a clear market position

Understanding Technology Leadership

Technology Leadership recognizes companies that lead the development and successful introduction of high-tech solutions to customers' most pressing needs, altering the industry or business landscape in the process. These companies shape the future of technology and its uses. Ultimately, success is measured by the degree to which a technology is leveraged and the impact that technology has on growing the business.

Key Benchmarking Criteria

For the Technology Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Technology Leverage and Business Impact—according to the criteria identified below.

Technology Leverage

Criterion 1: Commitment to Innovation
Criterion 2: Commitment to Creativity
Criterion 3: Technology Incubation
Criterion 4: Commercialization Success
Criterion 5: Application Diversity

Business Impact

Criterion 1: Financial Performance
Criterion 2: Customer Acquisition
Criterion 3: Operational Efficiency
Criterion 4: Growth Potential
Criterion 5: Human Capital

Best Practices Award Analysis for InfoBionic

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows our research and consulting teams to objectively analyze performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.

RATINGS GUIDELINES
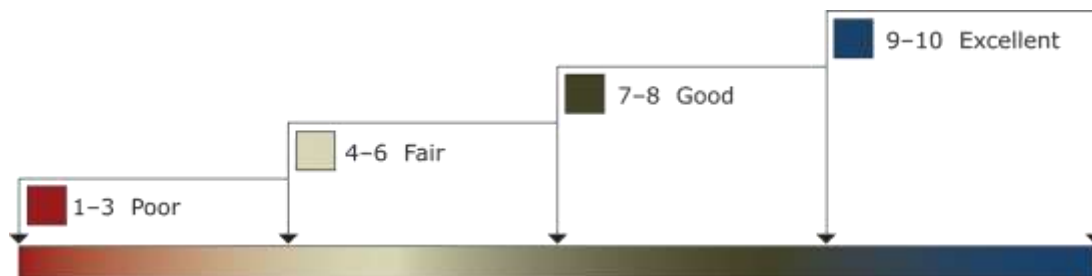
The Decision Support Scorecard is organized by Technology Leverage and Business Impact (i.e., These are the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard.). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms 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.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key participants as Competitor 2 and Competitor 3.

Measurement of 1–10 (1 = poor; 10 = excellent)			
Technology Leadership	Technology Leverage	Business Impact	**Average Rating**
InfoBionic	**9.5**	**9.5**	**9.5**
Competitor 2	8	7	7.5
Competitor 3	6.5	7.5	7

Technology Leverage

Criterion 1: Commitment to Innovation
Requirement: Conscious, ongoing development of an organization's culture that supports the pursuit of groundbreaking ideas through the leverage of technology

Criterion 2: Commitment to Creativity
Requirement: Employees rewarded for pushing the limits of form and function, by integrating the latest technologies to enhance products

Criterion 3: Technology Incubation
Requirement: A structured process with adequate investment to incubate new technologies developed internally or through strategic partnerships

Criterion 4: Commercialization Success
Requirement: A proven track record of successfully commercializing new technologies, by enabling new products and/or through licensing strategies

Criterion 5: Application Diversity
Requirement: The development of technologies that serve multiple products, multiple applications, and multiple user environments

Business Impact

Criterion 1: Financial Performance
Requirement: Overall financial performance is strong in terms of revenues, revenue growth, operating margin, and other key financial metrics.

Criterion 2: Customer Acquisition
Requirement: Overall technology strength enables acquisition of new customers, even as it enhances retention of current customers.

Criterion 3: Operational Efficiency
Requirement: Staff is able to perform assigned tasks productively, quickly, and to a high-quality standard.

Criterion 4: Growth Potential

Requirements: Technology focus strengthens brand, reinforces customer loyalty, and enhances growth potential.

Criterion 5: Human Capital

Requirement: Company culture is characterized by a strong commitment to customer impact through technology leverage, which in turn enhances employee morale and retention,

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.
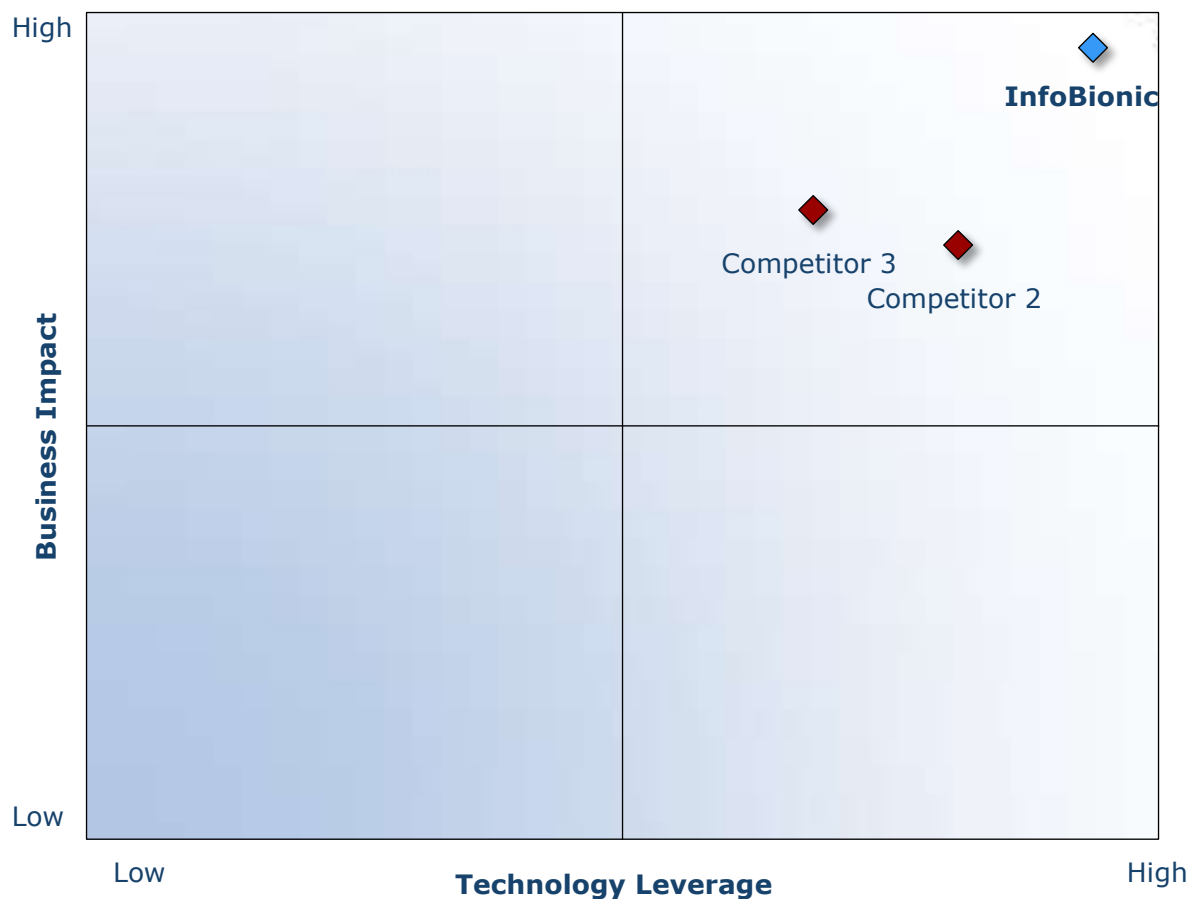
Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan Awards 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• Review analysis with panel • Build consensus • Select recipient	Decision on which company performs best against all best-practice criteria
9	**Communicate recognition**	Inform Award recipient of Award recognition	• Announce 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 is able to share Award news with stakeholders and customers	• 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 players 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.