



FROST & SULLIVAN

BEST  
2019 PRACTICES  
AWARD

GLOBAL MULTIPURPOSE DIGITAL RADIOGRAPHY  
SYSTEMS NEW PRODUCT INNOVATION AWARD

Best Practices Research

GLOBAL | Multipurpose Digital Radiography Systems

# NEW PRODUCT INNOVATION AWARD

A Frost & Sullivan White Paper

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50 Years of Growth, Innovation and Leadership



**AGFA** 

# DR 800

DIGITAL IMAGING MULTI-TOOL

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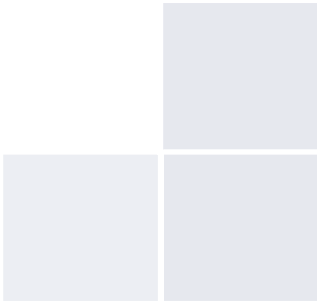
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## LETTER OF CONGRATULATIONS

Frost & Sullivan's global team of analysts and consultants continuously research a wide range of markets across multiple sectors and geographies. As part of this ongoing research, we identify companies that have successfully introduced new and innovative products into their markets, with emphasis on product quality and customer value. This involves extensive primary and secondary research across the entire value chain of specific products. Against the backdrop of this research, Frost & Sullivan is pleased to recognize Agfa N.V. as the New Product Innovation Leader in the Global Multipurpose Digital Radiography Systems Market.

To achieve excellence in new product innovation is never an easy task, but it is one made even more difficult considering today's competitive intensity, customer volatility, and economic uncertainty - not to mention the difficulty of innovating in an environment of escalating challenges to intellectual property. Within this context, your receipt of this Award signifies an even greater accomplishment.

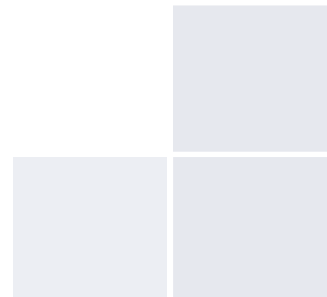
Moreover, we recognize that your selection as receipt of this Award is the result of many individuals (employees, customers, and investors) making daily choices to support the organization and contribute in a meaningful way to its future. We enthusiastically acknowledge and celebrate these achievements.

Once again, we congratulate you on your achievements and wish you great success in the future. We are here to support you on any future endeavor.

Sincerely yours,



David Frigstad  
Chairman  
Frost & Sullivan



## BACKGROUND AND COMPANY PERFORMANCE

### Industry Challenges

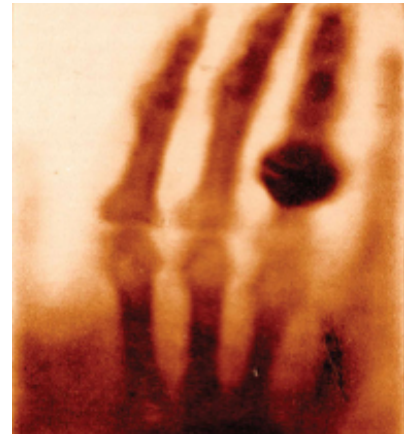
#### Digital Radiography: At-a-Glance

First introduced at the end of the 19th century, X-ray radiography is the workhorse of imaging modalities, occupying a significant role in diagnostics across medical settings and specialties at all levels of patient care.

Radiography is often the first-line test choice for diagnosing a range of indications, from acute injuries to suspected chronic diseases — a broken bone to stomach pains to lingering coughs. As of the end of 2015, an estimated 120,000 imaging facilities in the United States (US) operated about 200,000 X-ray rooms — an average of 1.7 X-ray room per facility — and performed at least 300 million exams per year.<sup>1</sup>

Technological advances in image acquisition and reconstruction over the last two decades have shifted radiography to the digital space. Today, digital radiography (DR) is the clinical care standard of modern radiology. Digital flat-panel detectors (FPD) acquire images immediately after exposure, without further laser scanning, generating readily available digital datasets for analysis, storage, transfer, and sharing.

The First X-ray: December 22, 1895



<http://www.thescientist.com/?articles.view/articleNo/30693/title/The-First-X-ray--1895/>

**Traditionally, Frost & Sullivan notes that there has been a clear line between static and dynamic X-ray procedures:**

- **General radiography** — static X-ray imaging; typically planar two-dimensional (2D) radiography used routinely in bone, chest, and abdomen examinations.
- **Fluoroscopy and angiography** — dynamic X-ray imaging or real-time X-ray imaging; uses image intensifiers and potentially contrast media to produce real-time continuous cine images that help clinicians visualize and detect abnormalities, typically in the gastrointestinal (GI) tract and blood vessels.

Next-generation DR systems leverage new premium FPD image acquisition and processing techniques, allowing for diagnostic-grade imaging across both static and dynamic X-ray applications. With superior resolution, faster processing, and the lowest possible radiation exposure for both clinicians and patients, Frost & Sullivan points out that these systems are blurring the lines between traditional product segments and, sometimes, with additional combined 2D and 3-dimensional (3D) functionalities, enable computed tomography (CT)-like image reconstruction.

<sup>1</sup>. Analysis of the US Digital and Computed Radiography Equipment Market (Frost & Sullivan, Aug 2016)

Conventional X-ray room design depends on the intended specific purpose — for instance, dedicated rooms for upright X-rays like chest radiography, angiography suites for vascular imaging, and radiography and fluoroscopy (R/F) rooms, dual purpose for GI examinations. Today, hospitals and other clinical settings are fueling the demand for advanced multi-modal DR systems to optimize asset utilization, both real estate and equipment, as clinical under-utilization as well as over-utilization hampers high-quality, cost-effective, patient-centered care.

The latest developments in X-ray systems bolster multi-purpose radiography, providing all stakeholders — physicians, patients, and healthcare centers — a previously unavailable level of quality, flexibility, and versatility. As first generation DR systems and DR-enabled systems reach the replacement stage, the US DR market is on the brink of a new growth phase driven by a renewed interest for innovative, full-scale, multi-purpose DR solutions. Frost & Sullivan estimates the global DR market at \$2 billion in 2018. The US remains the largest shareholder and market opportunity, with calculated revenues of \$445 million in 2017, and turnkey solutions accounting for nearly 50% of the market.<sup>2</sup>

## New Product Attributes and Customer Impact

Founded in 1867, Belgium-based Agfa N.V. (Agfa) is a global leader and pioneer in health information technology (IT) and digital imaging solutions. With a brand recognized for excellence worldwide, the company delivers best-of-breed DR systems to hospitals and healthcare systems in over 100 countries across six continents for cost-effective, high-quality, coordinated care delivery.

Frost & Sullivan recognized Agfa's comprehensive DR portfolio in 2016 and now distinguishes its DR 800 multi-purpose digital imaging system with Dynamic Multi-Scale Image Contrast Amplification processing, MUSICA®, further strengthening its value-driven proposition in digital radiography.

### Taking Digital Radiography to the Next Level

Most facilities markedly under-utilize fluoroscopy rooms — if at all, used only for a few hours per day - as procedure volumes have substantially declined due to CT taking the lion share of some traditional fluoroscopy studies. Yet fluoroscopy is still mandatory for a hospital's service line.

With market-creating product innovation as its cornerstone, Agfa leverages over century-old imaging expertise and customer-driven research and development efforts to bring forth DR products that bridge quality patient care, clinical relevance, and radiology workflows. Its novel DR 800 multi-purpose digital imaging system combines unique design features, technological trends, and the latest version of its best-in-class image reconstruction package, Dynamic MUSICA®, for both static and dynamic imaging – all in order to deliver enhanced diagnostic capability, flexibility, and versatility, driving efficiency gains while improving care quality.

Commercially available in the European Union (EU) since late 2017, the exceptional 3 in 1 DR system - radiography, fluoroscopy, and advanced clinical applications — received the **US Food Drug Administration's 510(k) clearance** in April 2018. Agfa plans to roll-out the DR 800 in the Canadian market next.

2. Analysis of the US Digital and Computed Radiography Equipment Market (Frost & Sullivan, August 2016)

## DR 800 Multi-Purpose Digital Imaging System

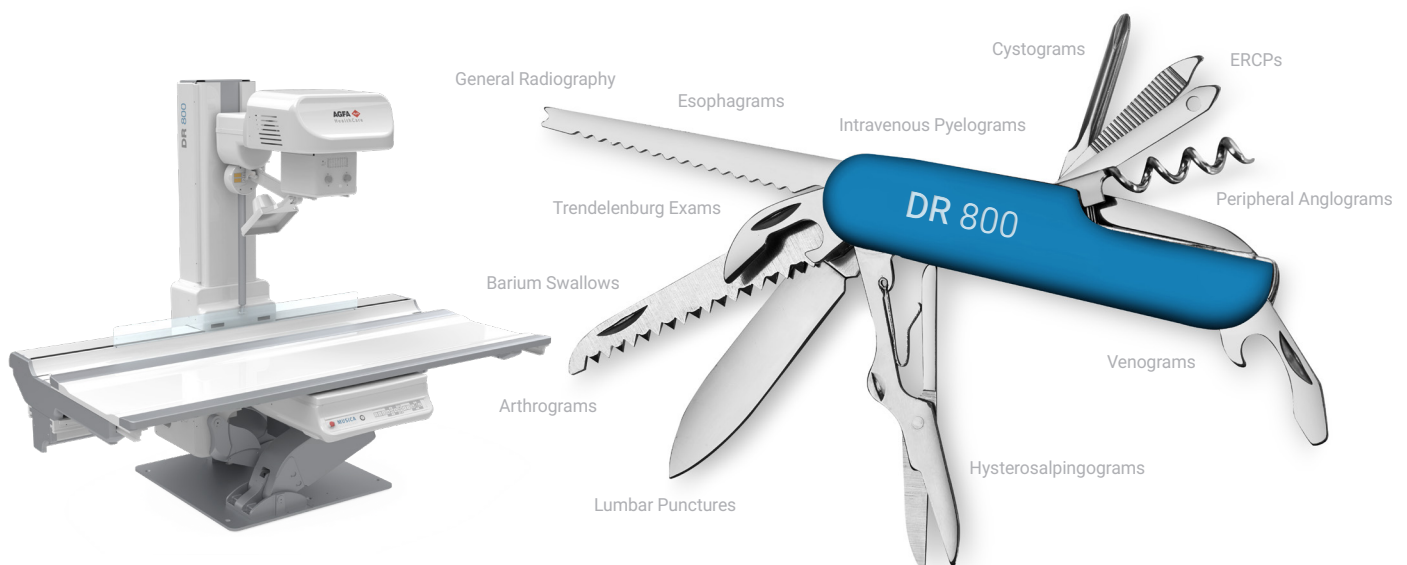
*“The analogy we [Agfa] typically use is that of a Swiss army knife. The DR 800 is adept at doing any procedure without compromising quality. Hospitals can use the DR 800 X-ray room all day long for different procedures; for instance, fluoroscopy in the mornings, radiographic work overnight, and, in the afternoon, procedures requiring a sterile field such as biopsies or open it up for speech pathologist studies. One customer we spoke with performed upwards of 20 speech pathology studies in a day.”*

*George Curley, Director of Marketing & Communications, Radiology Solutions, North America*

Until recently, dynamic and static imaging remained as two largely separate domains primarily due to different detector material optimization, e.g., either using low dose beams for real-time imaging or stronger X-ray beams for single-shot imaging. However, newer solid-state technologies, e.g., cesium iodide (CsI), bring together static and dynamic X-ray procedures, thus leading to multi-purpose opportunities.

Frost & Sullivan recognizes how Agfa properly taps into this approach with its new DR 800 multi-functional system. First showcased at the 2016 Radiological Society of North America (RSNA) meeting, the DR 800 multi-purpose system enables clinicians to perform general radiography and a full range of fluoroscopy examinations — from chest exams to full-leg and full-spine (FLFS) image stitching to lumbar punctures, arthrograms, and speech swallow studies to biopsies and minor interventional procedures — in one integrated, versatile room.

### Agfa's 3-in-1 DR system





The system boasts the same technologies as Agfa's best-of-breed DR portfolio —VarioDrive and LiveVision™ - along with game-changing Dynamic MUSICA®.

- VarioDrive, smooth moving motors, for manual or remote full table rotation and positioning, e.g., horizontal, vertical, or angled, allows placing of imaging patients in virtually any position effortlessly, including standing weight-bearing positions while enhancing the patient's experience
- LiveVision™, video camera built-in X-ray tube, provides a first-person camera view of the patient, enabling safe and accurate dose-free remote patient staging, i.e., avoids radiation exposure
- Dynamic MUSICA®, key competitive differentiator, industry-leading image processing software performs around 800 different calculations for every image, consistently producing high-quality radiographs for an accurate diagnosis from the first image

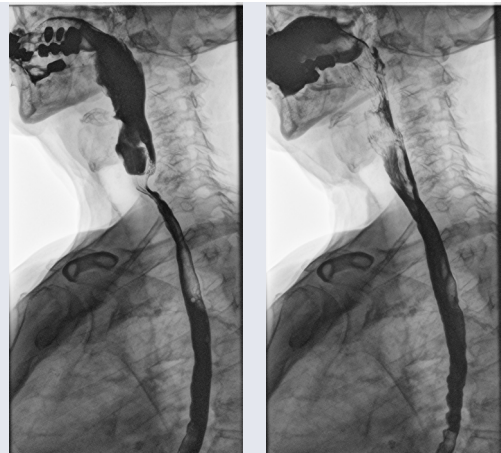
These technologies (along with advanced CsI detectors) support radiation dose optimization and reductions of up to 60%<sup>3</sup>.

Agfa's DR systems' value proposition revolves around maximizing patient care quality and safety, while still optimizing total-cost-of-ownership (TCO) and return on investment (ROI). Amid stiff competition in this value-driven landscape, the company's DR 800 streamlines imaging workflows while improving productivity and patient care with a capital investment of under \$400,000 — a compelling price compared to old style fluoroscopy rooms costing upwards of \$600,000.

### Purposeful Design, Customer-driven Innovation

*"We not only replace a fluoroscopy system, but offer much more value by intentionally designing a wide-ranging, multi-functional system for both radiography and fluoroscopy."*

*Ueli Laupper,  
Vice President Marketing and  
DR Business Unit Manager,  
Radiology Solutions,  
North America*



3. [https://medimg.agfa.com/dach/wp-content/uploads/sites/8/2016/12/OPTIMIZING\\_PATIENT\\_DOSE\\_Extended\\_version\\_English\\_-\\_Whitepaper.pdf](https://medimg.agfa.com/dach/wp-content/uploads/sites/8/2016/12/OPTIMIZING_PATIENT_DOSE_Extended_version_English_-_Whitepaper.pdf)



Healthcare systems face immense economic pressures on revenue as they strive to align with evolving value-based care demands. Initially intended for diagnostic purposes in dedicated R/F suites, DR equipment is often space-inefficient and cluttered - and its use is rather procedure-centric than patient-centric. Furthermore, archaic, cumbersome, difficult to use, and restrictive healthcare systems require additional purchases, e.g., overhead tube and wall stand, to meet their fluoroscopy demands.

Agfa initiated its research on unmet DR needs several years ago, conducting focus groups and keeping the pulse of its customers' evolving requirements. The company worked alongside radiologists, technologists, and administrators at Loma Linda University Medical Center and Florida Hospital, the largest healthcare provider in the US Southeast, while designing the DR 800 system.

With this customer-driven development approach, Agfa aligns design features and state-of-the-art technologies, including its best-in-class Dynamic MUSICA®, to set higher image quality, workflow productivity, and dose optimization standards. The multi-purpose DR 800 X-ray room allows healthcare organizations to optimize TCO, ROI, and improve value in the healthcare delivery chain — generating efficiencies through increased utilization rates, minimizing exam preparation and procedure times, and providing high-quality, patient-centered care.

*“Loma Linda University Medical Center and Florida Hospital had substantial input on the system’s look, feel, and features. Although we offer an overhead tube as an option, customers can do a lot in the room by thinking outside the box. It is part of the design’s beauty.”*

*Jared K. Houk, Senior Vice President and Regional Business Leader,  
Radiology Solutions, North America*



Agfa's DR 800 has an open design, allowing clinicians' easy patient access. For stretcher patients, 2 to 4 people can assist in transferring the patient from the gurney on to the X-ray table, and, with little creativity, e.g., turning the table upright, a stretch-bound patient can get X-rays still lying on the stretcher. The workstation's color pallet reduces operator's eye fatigue and makes it simple to see, providing overall eye strain relief. The DR 800 also performs seamless automatic stitching for FLFS imaging, 72-inch chest X-rays, i.e., 180-centimeter source to image distance, and handles bariatric patients — it can move a 584-pound (lb) patient without limitations, place a 705-lb patient on the table (well above the industry standard), and delivers unique imaging processing technique suitable for any patient — unlike other competing DR solutions that require ancillary tools.

The system's smooth motorized movements, height adjustment, positioning freedom, and remote control and in-room control capabilities enable unprecedented clinical versatility and flexibility, optimizing equipment performance, facilitating quick and easy procedures, and maximizing both patient and operator comfort.

### Multi-purpose DR 800 X-ray room



### Promising Outlook: Leading from the Front

*“We have several DR 800 systems already installed in the United Kingdom (UK) and Europe. Customers in Bath, the UK, are in love with the system, stating that it is the best thing that has ever happened. The DR 800 is our platform for innovation going forward.”*

*Georges Espada, Global Head of the CR and DR Business Unit*

Optimal asset management underscores a market participant's strategic agility significance. In the era of value-based care, all radiology providers, whether large or small, private or public, freestanding or hospital-based, need to perform more and better diagnoses in less time and with higher cost-efficiency for long-term viability and sustained profitability.

With its DR 800 multi-purpose system, Frost & Sullivan independent research concludes that Agfa takes DR one step further than any other competing solution. In the US, the company installed its first system late in August 2018, and the order pipeline is quickly building, including 50 to 60 leads in the outpatient and small community hospital market. Agfa is presenting the DR 800 at various trade shows, including the 2018 RSNA meeting.

In contrast with most competing solutions limited use, the DR 800 system still harnesses untapped capabilities. The company projects to add tomosynthesis and dual-energy functionalities in the next several months. This ongoing innovation cycle keeps Agfa one step ahead of its competitors.

Designed to deliver both value and performance, the DR 800 provides the type of value-add that benefits patient care more holistically. Frost & Sullivan firmly believes that Agfa is well-positioned to capitalize lucratively on the DR replacement market opportunity with its multi-functional DR system. The company's brand reputation on delivering high-end technology to help hospitals administer cost-effective, quality healthcare, will drive its continued success.

## CONCLUSION

A trickle-down effect from healthcare reform, the medical imaging industry is moving into a value-focused environment. X-ray equipment manufacturers need to address their customer's revenue pressures as they meet their digital radiography (DR) demands.

Asset management optimization is core to long-term viability and sustained profitability. With a customer-driven and patient-centric approach, Agfa N.V.'s (Agfa) DR 800 multi-purpose system combines design features and state-of-the-art technologies — such as VarioDrive and LiveVision™, along with game-changing Dynamic MUSICA® — enabling clinicians to perform general radiography, a full range of fluoroscopy examinations, and advanced clinical applications in one integrated versatile room.

Suitable for any patient, including the most challenging to image (e.g., bariatrics), Agfa's extensive, multi-purpose DR 800 X-ray room allows healthcare organizations to optimize total-cost-of-ownership and return on investment, maximizing productivity while still providing high-quality, patient-centered care.

**Its commitment to technological leadership and customer-driven, patient-centric innovation earn Agfa N.V. the 2019 Frost & Sullivan Global New Product Innovation Award.**



## SIGNIFICANCE OF NEW PRODUCT INNOVATION

Ultimately, growth in any organization depends upon continually introducing new products to the market and successfully commercializing those products. For these dual goals to occur, a company must be best-in-class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.



## UNDERSTANDING NEW PRODUCT INNOVATION

*Innovation is about finding a productive outlet for creativity - for consistently translating ideas into high-quality products that have a profound impact on the customer.*



## KEY BENCHMARKING CRITERIA

For the Global New Product Innovation Award, Frost & Sullivan analysts independently evaluated two key factors—New Product Attributes and Customer Impact—according to the criteria identified below.

### NEW PRODUCT ATTRIBUTES

- Criterion 1: **Match to Needs**
- Criterion 2: **Reliability**
- Criterion 3: **Quality**
- Criterion 4: **Positioning**
- Criterion 5: **Design**

### 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"> <li>• Conduct in-depth industry research</li> <li>• Identify emerging sectors</li> <li>• Scan multiple geographies</li> </ul>	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"> <li>• Interview thought leaders and industry practitioners</li> <li>• Assess candidates' fit with best-practice criteria</li> <li>• Rank all candidates</li> </ul>	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"> <li>• Confirm best-practice criteria</li> <li>• Examine eligibility of all candidates</li> <li>• Identify any information gaps</li> </ul>	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"> <li>• Brainstorm ranking options</li> <li>• Invite multiple perspectives on candidates' performance</li> <li>• Update candidate profiles</li> </ul>	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"> <li>• Share findings</li> <li>• Strengthen cases for candidate eligibility</li> <li>• Prioritize candidates</li> </ul>	Refined list of prioritized Award candidates
6	Conduct global industry review	Build consensus on Award candidates' eligibility	<ul style="list-style-type: none"> <li>• Hold global team meeting to review all candidates</li> <li>• Pressure-test fit with criteria</li> <li>• Confirm inclusion of all eligible candidates</li> </ul>	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"> <li>• Perform final performance benchmarking activities</li> <li>• Write nominations</li> <li>• Perform quality review</li> </ul>	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"> <li>• Review analysis with panel</li> <li>• Build consensus</li> <li>• Select recipient</li> </ul>	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"> <li>• Present Award to the CEO</li> <li>• Inspire the organization for continued success</li> <li>• Celebrate the recipient's performance</li> </ul>	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	<ul style="list-style-type: none"> <li>• Coordinate media outreach</li> <li>• Design a marketing plan</li> <li>• Assess Award's role in future strategic planning</li> </ul>	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>.

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## NEXT STEPS



**Schedule a meeting with our global team** to experience our thought leadership and to integrate your ideas, opportunities and challenges into the discussion.



Interested in learning more about the topics covered in this white paper? Call us at 877.GoFrost and reference the paper you're interested in. We'll have an analyst get in touch with you.



Visit our **Transformational Health** web page.



Attend one of our **Growth Innovation & Leadership (GIL)** events to unearth hidden growth opportunities.

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