

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

FROST & SULLIVAN BEST PRACTICES AWARD

BLOCKCHAIN TECHNOLOGY FOR HEALTHCARE BILLING
AND CLAIMS ADJUDICATION - NORTH AMERICA

Enabling Technology Leadership
2019

CHANGE
HEALTHCARE

FROST & SULLIVAN

2019

BEST
PRACTICES
AWARD

Contents

Background and Company Performance	3
<i>Industry Challenges</i>	3
<i>Technology Leverage and Customer Impact of Change Healthcare</i>	5
<i>Conclusion</i>	9
Significance of Enabling Technology Leadership	10
Understanding Enabling Technology Leadership	10
<i>Key Benchmarking Criteria</i>	11
Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices.....	12
The Intersection between 360-Degree Research and Best Practices Awards.....	13
<i>Research Methodology</i>	13
About Frost & Sullivan	13

Background and Company Performance

Industry Challenges

Rising healthcare costs to unsustainable levels in the United States (US) are shifting the industry from fee-per-service to value-based reimbursement models. Given the process complexities together with a regulatory-driven sector, healthcare service has its own cost and is increasing rapidly. For example, the medical billing process is an integral part of the healthcare sector to ensure proper service delivery. However, current inefficiencies with billing and insurance-related (BIR) activities and fraudulent medical claims create critical challenges for health insurance companies with approximately 6% of global healthcare spending lost every year due to fraud, waste, and abuse.¹ The situation is dire for countries such as the US, where excessive billing-related administrative burdens cost the health care system about \$496 billion.² Organizational inefficiencies add another layer of needless expense. Consequently, the US spends far more on health care than any other nation on the globe, about 17-18% of the gross domestic product.³

Estimated Administrative Costs Related to Billing and Insurance in the US, 2019

Category	Annual cost in billions
Providers (physicians, hospitals, and others)	\$282
Private insurers	\$158
Public programs	\$56
Total	\$496

Source: Authors' calculations based on National Academy of Medicine, "Excess Administrative Costs," in Pierre Yong, ed, *The Healthcare Imperative: Lowering Costs and Improving Outcomes: Workshop Series Summary* (Washington: National Academies Press, 2011); Centers for Medicare and Medicaid Services, "National Health Expenditure Data," available at <https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/nhe-fact-sheet.html> (last accessed January 2019).



Source: Center for American Progress

¹ Button, Mark & Gee, Jim. "The Financial Cost of Healthcare Fraud." 2015.

https://www.researchgate.net/publication/299378586_The_Financial_Cost_of_Healthcare_Fraud

² Gee, Emily and Topher Spiro. "Excess Administrative Costs Burden the U.S. Health Care System." April 2019. Center for American Progress. July 2019

<<https://www.americanprogress.org/issues/healthcare/reports/2019/04/08/468302/excess-administrative-costs-burden-u-s-health-care-system/>>.

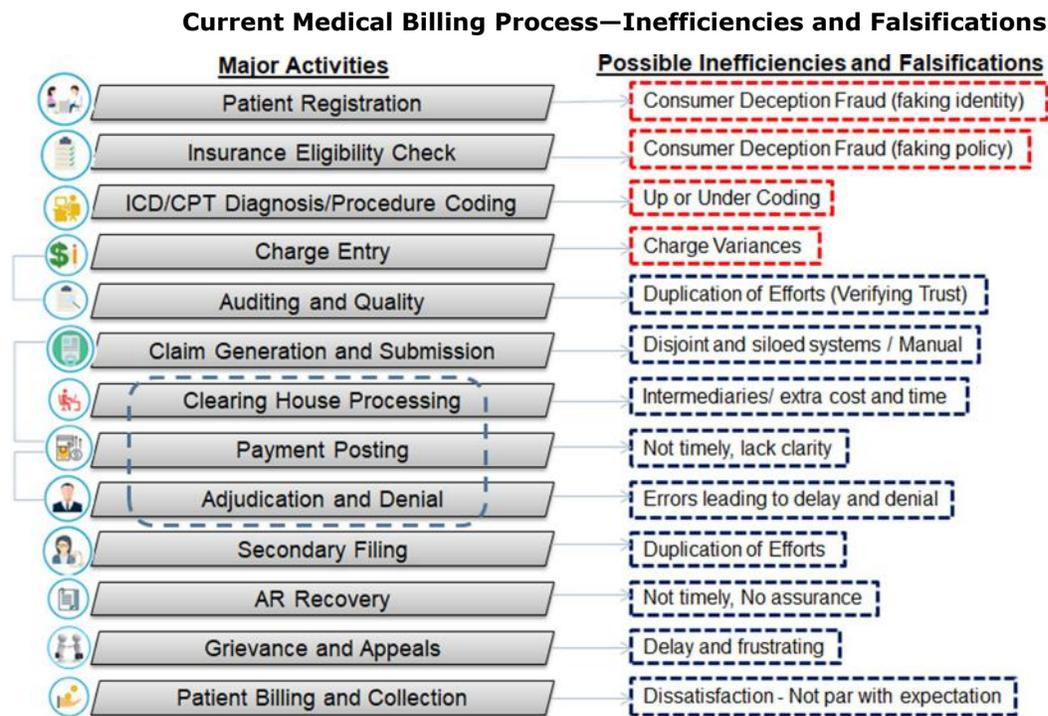
³ Davis, Kenneth L. "The real reason health care is bankrupting America." January 2018. CNBC. July 2019

<<https://www.cnbc.com/2018/01/11/the-real-reason-health-care-is-bankrupting-america.html>>.

Costly Medical Billing Falsifications and Process Inefficiencies

Limitations with current systems make the data reconciliation process in healthcare expensive, error-prone, and inefficient, thus hindering reliable and complete information sets. Physicians overburdened with recording medical records electronically spend extensive time and energy, causing burnout and billing errors. Fraudulent insurance claims and medical billing inefficiencies face rejection and financial losses. As per the Centers for Medicare and Medicaid Service (CMS), rejected claims constitute almost 20% of the 4.6 million applications submitted per day, and due to invalid ICD codes, and denied claims comprise 10% of the total processed requests.⁴

An estimated 5% to 10% of healthcare costs are fraudulent, resulting from excessive billing, charges for non-performed services, or canceled procedures. For example, during April 2019, US federal officials uncovered a \$1.2 billion Medicare fraud scheme affecting hundreds of thousands of elderly and disabled patients.⁵ The fraudulent claims generate higher premiums, lower benefits and coverage, and more out-of-pocket expenses for patients. The impact on employers, both the private and public sectors, raises the overall business expenditure on providing employee medical insurance and benefits.



Source: Frost & Sullivan.

⁴ Buck, Chuck. "Health Systems Submitting 4.6 Million ICD-10 Claims Daily." October 2015. ICD10monitor . July 2019 <<https://www.icd10monitor.com/health-systems-submitting-4-6-million-icd-10-claims-daily>>.

⁵ Chokshi, Niraj and Julia Jacobs. "24 Charged in \$1.2 Billion Medicare Scheme, U.S. Says." April 2019. The New York Times. July 2019 <<https://www.nytimes.com/2019/04/09/us/billion-dollar-medicare-scam.html>>.

Multi-Level Payment Transaction Cause Operational Complexities and Delays

Multiple stakeholders, e.g., payers, providers, and financial institutions, are involved in the payment transaction process, each of whom must rely on disparate batch file transfers of the payment status. Delay in real-time payment status updates has immediate revenue and business impact, even creating compliance issues for healthcare providers. Therefore, the need to quicken the revenue cycle management (RCM) is profound. Additionally, due to multi-level interactions of several banks, processes, and various intermediaries between the payer and the provider, the payment processing workflow is complex, time-consuming, and costly. Limited transparency provides poor clarity to patients over any payments made, and their remaining amount owed after insurance claims settlement.

Payers and providers often outsource administrative processes to third-party RCM vendors and clearinghouses to mitigate BIR inefficiencies. However, lack of trust and integrity around claims adjudication and billing management is only increasing with continued waste and falsification.

Early applications of blockchain technology to BIR processes promise to address such inefficiencies by using trusted and transparent systems for every stakeholder. Blockchain can ensure open systems, engage all stakeholders in the whole process, and remove mistrust. Therefore, it is critical for existing billing and claims management vendors to explore blockchain technology. Its trusted and ubiquitous security infrastructure for seamless health data exchange will potentially save time, eliminate data reconciliation's cost burden, and ease auditability. Emerging blockchain systems promise to unlock new economic advantages and streamline workflow interactions by limiting intermediaries and automating transactional services across healthcare service transactions.

Frost & Sullivan research estimates successful blockchain deployment in claims adjudication and billing management and RCM can potentially save up to \$97.5 billion globally, optimizing current workflows with better auditability and traceability around these processes.⁶

Technology Leverage and Customer Impact of Change Healthcare

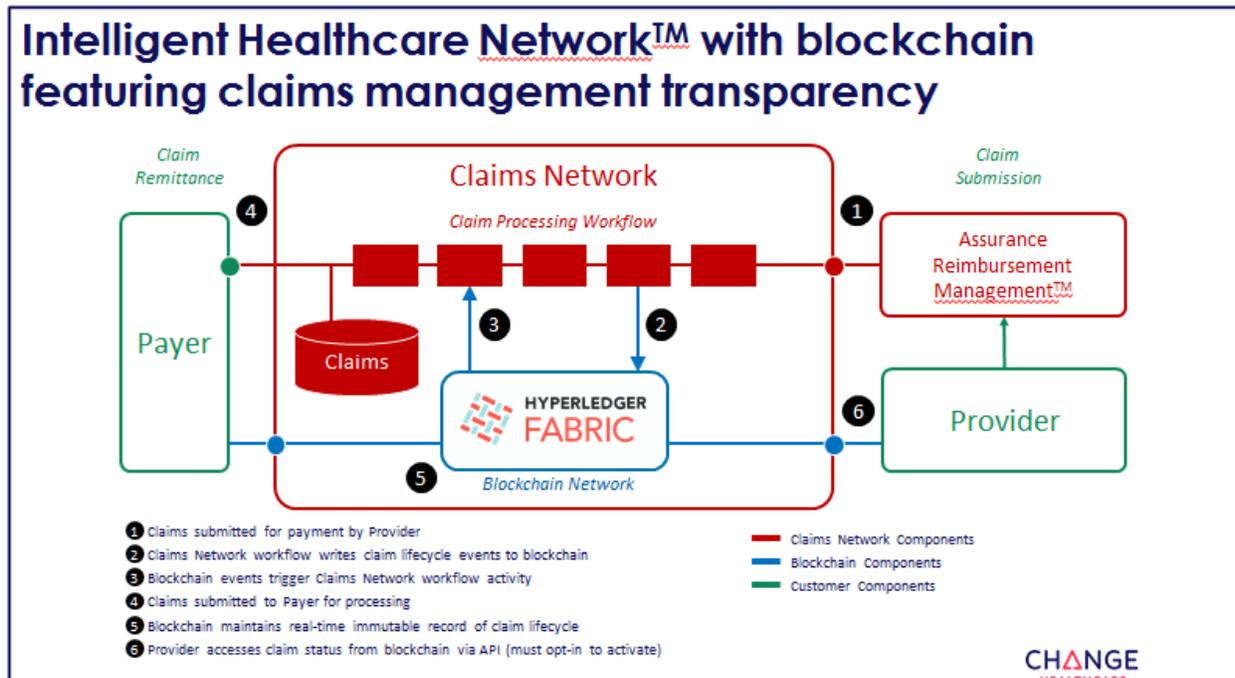
Change Healthcare is a leading independent healthcare technology company that provides data and analytics-driven solutions to improve clinical, financial and patient engagement outcomes in the U.S. healthcare system. It is a key catalyst of a value-based healthcare system, accelerating the journey toward improved lives and healthier communities.

Change Healthcare pioneered implementing enterprise-scale blockchain technology in healthcare with its Intelligent Healthcare Network™ with blockchain featuring claims management transparency.⁷ Beyond driving next-level healthcare IT innovation through blockchain in the US healthcare payment and claims adjudication sector, the company is instrumental as a clearinghouse for insurance claims with both healthcare providers and insurers as clients.

⁶ *Blockchain Technology in Global Healthcare, 2017–2025*, (Frost & Sullivan, June 2017)

⁷ <https://www.changehealthcare.com/press-room/press-releases/detail/change-healthcare-announces-general-availability-of-first-enterprise-scale-blockchain-solution-for-healthcare>

Intelligent Healthcare Network™



PROPRIETARY & CONFIDENTIAL

Source: Change Healthcare

Accelerating Claims Lifecycle Management through Traceable and Auditable Blockchain Technology

Change Healthcare is improving RCM by accelerating healthcare payment processing efficiently, propelling a value-based healthcare system. To that end, in January 2018, the company commercially deployed the first enterprise-scale blockchain network for healthcare. The network, designed to improve claims lifecycle management transparency, allowed payers and providers to process claims more accurately, securely, and cost-effectively with increased operational efficiencies.

Change Healthcare leveraged Hyperledger Fabric™ 1.0, open-source blockchain architecture of The Linux Foundation, to build its blockchain framework. Coupled with a cloud-based offering, the company deployed the network on scalable Amazon web-based cloud services. The network design was built to help ensure hospitals and insurers could track the status of claims from submission to payment in real-time allowing payers and providers to benefit from having an immutable, auditable, and readily accessible record with lower administrative costs and near real-time adjudication.

Presently, Change Healthcare processes 14 Billion healthcare transactions per year, so their blockchain network needed to be able to scale to efficiently manage high throughput. The system has shown the capability to process more than 50 million claim events per day and up to 550 transactions per second.⁸ Groundbreaking capacity and speed have proven

⁸ "Change Healthcare Announces General Availability of First Enterprise-Scale Blockchain Solution for Healthcare." Default, 8 Jan. 2018, www.changehealthcare.com/press-room/press-releases/detail/change-healthcare-announces-general-availability-of-first-enterprise-scale-blockchain-solution-for-healthcare.

that blockchain can scale to manage daily national transaction load and throughput requirements.

For RCM, the company's blockchain development work is demonstrating the potential blockchain has to streamline network communications, create crowd-managed policies, automate audits and reporting, and enforce security measures. For B2B clinical data exchanges, blockchain capabilities could instantly validate data asset integrity, develop a global data-sharing repository, and automate data and events exchange. Usable for enhancing patient and caregiver engagement, blockchain technology will empower identity continuity across systems and improve patient autonomy; thus, implementing patient's consent preference uniformly across the patient management cycle. With a connected healthcare model to improve patient outcome cost-effectively, the company is well-positioned to scale blockchain—as well as other emerging technologies like artificial intelligence, machine learning, and analytics—across its offerings.

Endeavoring to Promote Transparency and Collaboration through a Distributed Ledger

Change Healthcare applies distributed ledger technology (DLT) to connect stakeholders in the medical billing process to communicate and collaborate seamlessly. Linking disparate and siloed systems, organizations, and partners potentially through smart contracts, the company seeks to provide the highest auditable, end-to-end transparency on the payments process, from origination to settlement.

Change Healthcare's vision is to decentralize data for all stakeholders by implementing blockchain for better visibility and healthcare record immutability, helping reduction of BIR costs and facilitating transparent transactions. The company is transforming claims lifecycle management by uniting various internal business processes into a single, shared, and scalable network. Furthermore, a DLT-based source of truth for claims and transaction data will further empower payers and providers to move from current legacy systems to innovative contract models, much needed for value-based reimbursement paradigms.

Change Healthcare is collaborating with TIBCO Software on a smart contract system for healthcare using TIBCO's smart contract developer project software, Project Dovetail™.⁹ The platform aims to enable health plans and their financial partners to quickly develop and deploy smart contract-based processes that automate events across the healthcare transaction processing lifecycle. Through smart contracts, the platform can provide real-time payment status view, harmonize and automate payment systems, and help ensure data privacy.

Realizing Time and Cost Efficiencies with Enhanced Payment Visibility

Frost & Sullivan believes that Change Healthcare's blockchain-enabled Intelligent Healthcare Network™ platform will deliver unprecedented value to the entire stakeholder community. In the long term, blockchain technology enables providers and payers to have

⁹ "Change Healthcare and TIBCO to Bring Blockchain-Powered Smart Contracts to Healthcare." Default, 5 Nov. 2018, www.changehealthcare.com/press-room/press-releases/detail/change-healthcare-and-tibco-bring-blockchain-to-healthcare.

a more profound relationship with each other and the patient. More specifically, it enables providers to realize payments significantly faster, enables payers to have a better view of their cash flow, risk, and provider network management process, and enables patients to enjoy more accurate and near instantaneous communication over their bills.

For example, payers and providers leveraging Change Healthcare's blockchain network could enable insurance companies to pre-approve payments for scheduled procedures. Post-procedure, providers could notify payers about procedure completion. Hence, while traditional insurance eligibility checks span 7 to 14 days to find whether a clinical intervention qualifies for insurance, a blockchain-enabled smart contract can reduce the response time to minutes for routine medical checks like mammograms. The business impact of speedy claims authorization quickens payment disbursement, enabling hospitals and clinics to collect payment immediately at the point of care the very same day. Furthermore, patients gain accurate and instantaneous visibility into their medical payment status, e.g., accounts cleared and due post-procedure, enabling to evaluate their dues in an insurance co-payment model before even leaving the doctor's office.

Blockchain technology also eliminates the need for multi-level, paper-based, post-procedure transactions, i.e., statements and bills, between payers, providers, and patients. Access to shared data by all three parties streamlines transactional activities, eliminates reconciliation requirements, and shortens the payment cycle, saving time and money.

Driving Patient-centered Healthcare

Change Healthcare is focusing on generating awareness of blockchain's benefits to its partners and facilitating easy adoption by eliminating users' integration challenges. Currently, Intelligent Healthcare Network™ penetrates government and commercial payers—managing 1 in 3 patient records in the US via more than 5,500 hospitals, 900,000 physicians, and 33,000 pharmacies.¹⁰ The company acquired PokitDok, Inc. in late 2018, fortifying Change Healthcare's capabilities to extend its technological leadership across digital health, telemedicine, and disruptive care models supporting value-based, patient-centric healthcare.

Despite blockchain technology's nascent emergence in the healthcare space, Frost & Sullivan believes that Change Healthcare's early success will disrupt the current claims lifecycle management market. Furthermore, the company's progressive approach to further integrate the potential application of blockchain across RCM, clinical data exchange, and patient and caregiver engagement use-cases can enhance market adoption and provide it with a unique competitive advantage.

¹⁰ <https://www.changehealthcare.com/about>

Conclusion

Lack of trusted workflows in current legacy systems leads to inherent inefficiencies with the present medical billing and claims adjudication process, making it prone to falsification and fraud. Multi-level transactions delay and complicate revenue cycle management workflows due to restricted communication and transparency across the involved parties.

The Intelligent Healthcare Network™ Blockchain technology from Change Healthcare has shown it can quicken claims processing while lowering administrative costs. Enhancing trusted communication and data exchange across the medical claims management lifecycle, the technology streamlines and tracks interactions and events accurately, and helps to relay information reliably to all concerned stakeholders in the shortest time.

Frost & Sullivan finds that the Change Healthcare blockchain enabled Intelligent Healthcare Network™ is one of the largest successful commercial deployments of blockchain technology in healthcare B2B enterprise applications. The solution demonstrates industry-leading transparency, process integrity, and efficiency for better auditability and traceability around the claims management process.

With its strong overall performance, Change Healthcare earns Frost & Sullivan's 2019 North America Enabling Technology Leadership Award in the blockchain technology for healthcare billing and claims adjudication market.

Significance of Enabling Technology Leadership

Ultimately, growth in any organization depends on customers purchasing from a company and then making the decision to return time and again. In a sense, then, everything is truly about the customer. Making customers happy is the cornerstone of any successful, long-term growth strategy. To achieve these goals through enabling technology leadership, an organization must be best in class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.



Understanding Enabling Technology Leadership

Product quality (driven by innovative technology) is the foundation of delivering customer value. When complemented by an equally rigorous focus on the customer, companies can begin to differentiate themselves from the competition. From awareness, to consideration, to purchase, to follow-up support, organizations that demonstrate best practices deliver a unique and enjoyable experience that gives customers confidence in the company, its products, and its integrity.

Key Benchmarking Criteria

For the Enabling Technology Leadership Award, Frost & Sullivan analysts independently evaluated Technology Leverage and Customer Impact according to the criteria identified below.

Technology Leverage

Criterion 1: Commitment to Innovation

Requirement: Conscious, ongoing adoption of emerging technologies that enable new product development and enhance product performance.

Criterion 2: Commitment to Creativity

Requirement: Technology leveraged to push the limits of form and function in the pursuit of white space innovation.

Criterion 3: Stage Gate Efficiency

Requirement: Adoption of technology to enhance the stage gate process for launching new products and solutions.

Criterion 4: Commercialization Success

Requirement: A proven track record of taking new technologies to market with a high rate of success.

Criterion 5: Application Diversity

Requirement: The development and/or integration of technologies that serve multiple applications and can be embraced in multiple environments.

Customer Impact

Criterion 1: Price/Performance Value

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market.

Criterion 2: Customer Purchase Experience

Requirement: Customers feel they are buying the optimal solution that addresses both their unique needs and their unique constraints.

Criterion 3: Customer Ownership Experience

Requirement: Customers are proud to own the company's product or service and have a positive experience throughout the life of the product or service.

Criterion 4: Customer Service Experience

Requirement: Customer service is accessible, fast, stress-free, and of high quality.

Criterion 5: Brand Equity

Requirement: Customers have a positive view of the brand and exhibit high brand loyalty.

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 recipient 	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 is 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.



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>.