FROST & SULLIVAN

BEST PRACTICES AWARDS

mphRx

BREAKING BARRIERS IN HEALTHCARE

2020 GLOBAL DIGITAL TRANSFORMATION PLATFORM ENABLING TECHNOLOGY LEADERSHIP AWARD

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Background and Company Performance

Industry Challenges

An aging population coupled with rising economic pressures and regulations triggered complex and disruptive changes in the global healthcare industry over the last decade, transforming the care delivery and payment landscape from fee-for-service to value-based care and reimbursement models. Alongside this paradigm shift, Frost & Sullivan observed how new networks of interconnected healthcare stakeholders emerged, showcasing information technology's (IT) leading role in healthcare's digital transformation.

Healthcare organizations around the world progressively rely on IT-enabled data management, business intelligence, and quality reporting capabilities to boost their clinical performance, operational agility, and financial competitiveness. Digital health has resulted in a complex technology-based environment with numerous data streams, including patient-generated health data. Healthcare data's size (both structured and unstructured) and complexity are growing exponentially, from 153 exabytes in 2013 to an astronomical 2,314 exabytes by 2020.[1] The 3Vs of Big Data, volume, velocity, and variety, will soon reach zettabyte and yottabyte levels, with the healthcare industry creating more than 2 exabytes of medical data per day.[2]

As such, efficiently navigating, aggregating, and synthesizing the data ocean to derive meaningful insights is imperative to answer its higher call: value-based care. Digital enablers like artificial intelligence (AI) and machine learning (ML) can leverage real-world data assessment to provide intelligent, actionable insights from large, complex, and seemingly unrelated data. However, Frost & Sullivan notes that its potential clinical and business value remains limited. Interoperability between different IT systems within and across health organizations and providers is often lacking, limiting data quality, an analytics engine's primary input.

Different hospital departments (i.e., radiology, cardiology, pathology, acute care, intensive care, laboratory, and administration) leverage various vendors' systems. Typically, multi-vendor application-specific IT products do not allow for data transfer between solutions or integration with EMRs, minimizing interoperability across health centers, and creating large data silos. As a result, health personnel often engage in time-consuming activities, such as multiple system entries, searching for the same patients in various user interfaces, and accessing different image viewers from different vendors that result in workplace chaos and informational depots.

Value-based programs require an interoperable IT ecosystem, comprising integrated electronic medical records (EMR), payer-agnostic revenue cycle management (RCM) platforms, and cross-functional supply chain solutions. With data analytics solutions collecting accurate data from these underlying sources and normalizing evidence at the patient, provider, and payer levels, healthcare stakeholders can properly push the performance envelope without compromising quality.

[1] *https://news.itu.int/power-global-healthcare-data/, Accessed in August 2020*
[2] *Global Healthcare Cloud Computing Market, Forecast to 2023 (Frost & Sullivan, Jan 2020)*

Globally, the crucial need to securely access and analyze all data along the patient-care journey is driving next-generation technologies. For effective transformation, a healthcare digitization framework must support 4 central objectives: engage healthcare consumers, enable coordinated care, improve clinical and operational outcomes, and allow for scalability to keep pace with rapidly changing needs.

As part of the evolutionary change, cloud platforms integrate data from various sources within and outside an organization to enable better patient engagement, real-time monitoring and ubiquitous care delivery, and improved communication and collaboration. They can also power real-time analytics, machine learning, and AI, providing higher value to organizational data sets to drive precision medicine forward. Simultaneously, as an operational expenditure, cloud-based solutions bring healthcare costs down substantially, relieving economic pressures.

Frost & Sullivan estimates the global healthcare cloud computing market reaching over $15 billion by 2023, increasing at a compound annual growth rate of 24% from 2018 to 2023.[3] Health data continuity, imaging informatics, real-world data and analytics, population health management, and telemedicine present substantial growth opportunities in the coming years, comprising nearly 50% of the projected revenues, i.e., about $7.4 billion in 2023.[4]

Frost & Sullivan analyst conclude that healthcare organizations must combine advanced digital tools to deliver holistic, longitudinal patient information from distinct IT systems seamlessly to identify gaps in care early and intervene with evidence quantifying how to save money, increase revenue, and improve clinical outcomes. As the industry moves forward, cloud interoperability and vendor neutrality are critical factors in vendor selection. Healthcare organizations must deploy enterprise-wide strategies, i.e., enabling systems to work efficiently and collaborate effectively across vendors, facilities, departments, and formats, to keep up with increasing clinical and operational workloads and functionalities.

Technology Leverage and Customer Impact

Headquartered in New York, MphRx, Inc. (MphRx) sets a new standard for innovation within virtual care with its innovative, enterprise-level SMART on FHIR digital health platform, Minerva. The company's commitment to value and efficiency led it to design Minerva, addressing healthcare's digital transformation three main challenges: robust, comprehensive solution, care coordination, and interoperability. The platform covers the entire span of care needs for patients, clinicians, and hospitals. It heightens care quality through personalized and informed care decisions and patient satisfaction via a single location for scheduling, care, and bill-pay. Minerva also streamlines clinical and operational workflows while leveraging data analytics and workflow automation

[3] *Global Healthcare Cloud Computing Market, Forecast to 2023 (Frost & Sullivan, Jan 2020)*
[4] *Ibid*

Minerva: Breaking Digital Barriers, Bridging Workflow Gaps

MphRx, Inc. designed its innovative Minerva platform to aggregate data across hospital data sources and IT systems, e.g., EMRs, HIS, PACS, and healthcare management software. It creates a single, unified, and vendor-neutral patient record based on Fast Healthcare Interoperability Resources (FHIR).

Vendor-neutrality Eliminates Data Silos. Interoperability is the number one challenge in deploying healthcare IT systems effectively.

The vendor-neutral and open standards-based platform empowers healthcare systems' digital transformation. The unified patient record (UPR) enables unmatched data-flow from disparate sources and formats for various health applications, including billing, patient data-management, patient access to virtual care, and clinician communication. Consequently, Minerva improves visibility across the care continuum for all health stakeholders from patients and clinicians to hospital administrators) transforming clinical and operational workflows, heightening patient engagement, and empowering care coordination.

API Framework Enables Smooth, Secure Data Integration. MphRx built its platform's interoperability core layered across an entire healthcare organization. The platform's Substitutable Medical Applications and Reusable Technologies (SMART) on FHIR framework provides configurable access controls to extract, transform, and load enterprise data warehouse systems. MphRx created Minerva with best-in-class data normalization and transformation capabilities to aggregate the patient's information into the UPR. Thereby, data from multiple vendor systems, locations, and formats are available, viewable, and usable enterprise wide. Stored as native FHIR resources, the normalized data supports easy document and imaging retrieval from a single source. The platform's centralized audit framework provides a trail for each API call and action, tracking data access and usage for regulatory audit and complying with patient protections worldwide (including HIPPA and GDPR).

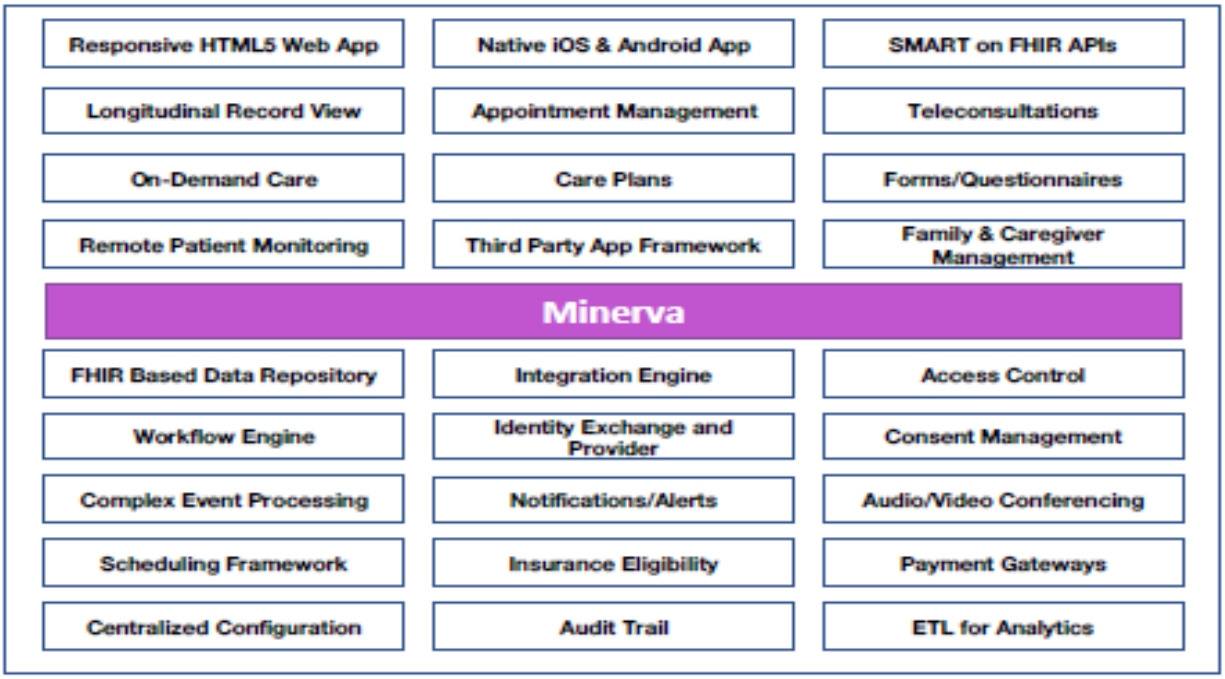
Analytics Capabilities Enhance Clinical and Operational Workflows. Predictive analytics leverages Big Data and analytics to provide intelligent, actionable insights from large, complex, and seemingly unrelated data for patient-centric business decisions.

MphRx's Minerva incorporates data analytics and third-party AI-enabled technologies into empowering healthcare systems to leverage Big Data properly and enhance overall performance. The platform analyzes and transforms data into customized datamarts for various business and clinical needs, allowing facilities to identify organizational bottlenecks and workflow inefficiencies. Healthcare systems can, in turn, enhance workflows and reduce operating costs, achieving increased ROI and long-term sustainability. Cost-effective workflows generate lower turnaround times leading to higher patient volumes. More importantly, Frost & Sullivan points out that hospitals can deliver affordable, quality care and improved outcomes, their core mission - resulting in satisfied, healthier patients.

Scalable, Modular Architecture Key to Successful Digital Transformation. Managing scalability and variability on-demand are crucial to healthcare providers' sustainability. Cloud deployment is the most sought after approach to achieve this goal.

MphRx designed Minerva with scalability in mind, using the building block approach to accelerate digital health innovation. Customers can leverage software components already purchased, add to the hospitals' existing IT investments and legacy systems, and, through dedicated cloud deployments, enable quick and scalable application development, resulting in a high return on investment (ROI). The platform can also scale horizontally and extend across multiple sites for a single health system.

Minerva's Building Blocks



Courtesy of MphRx

MphRx installs Minerva as a dedicated instance for customers, either on-premise on virtual machines or the user's cloud choice, e.g., Microsoft Azure, AWS, Google Cloud, or Alibaba. The platform grows with patients, physicians, and health systems' needs, setting an impressive new standard for virtual health, care coordination, and interoperability.

Patient Activation: Comprehensive Virtual Care App

Patient engagement is becoming a critical component of care delivery and a central pillar to advancing digital wellness, preventive health strategies, and cost-effective chronic care management.

Minerva offers patients care options across multiple channels (including on-site, telemedicine, and on-demand) on a single digital location. Patients can manage their full-care experience proactively by downloading an iOS and Android compatible application (app).

Patients can book in-person appointments at the hospital location, urgent care centers, or home visits, schedule virtual consultations, review laboratory and imaging tests results, set up in-home sample collection (LabFly), check and pay bills, and order prescriptions through the app. Additionally, patients can view and manage their unified health records, control their profile, and securely upload previous medical history data for themselves or family members.

More importantly, the app empowers personalized care management by creating tailored care pathways with built-in gamification and rewards tools to increase use. The app includes notifications, online questionnaires and surveys, and patient education tools. It also facilitates access to third-party health apps, making it an all-in-one full patient care management platform.

360-degree Patient View: Streamlined, Holistic Patient-centered Care

Minerva enables streamlined clinical workflows and enhances care quality. Clinicians have access to the entire patient's health data on a single, secure interface. Its clinician facing features simplify workflows and increase care quality.

Minerva's UPR offers clinicians real-time access to clinical data from all sources, including discrete elements and disparate sources. With the entire patient data, e.g., laboratory, diagnostic, and imaging results, displayed in a chronological timeline to view, physicians can make timely, informed, and personalized care decisions, enhancing care quality. The platform allows physicians to securely share and communicate across specialties and departments, providing unmatched collaboration for coordinated care decisions.

Extensible and expandable, Minerva supports third-party integration with the patient's EMR, with SMART on FHIR and third-party applications, pulling data into the UPR regardless of the vendor. The platform incorporates access control roles based on control management to limit patient data access and functionalizes based on user groups. Customizable rules-based on data parameters ensure that only proper personnel can access patient data, complying with strict patient privacy and data security requirements.

Minerva's workflow engine enables healthcare organizations to customize and configure complex workflows within the platform, managing escalations and sending reports to its task management framework to streamline care. The platform also has single sign-on integration with LDAP, SAML, and OAuth2 auth providers, allowing physicians to enter one username and password to access all of the patient's information. As such Minerva facilitates personalized population- and patient-level views for each clinician, helping them manage patients and their patient population simultaneously to ensure proper care is given where and when needed.

Minerva also powers holistic RPM by connecting the patient's health devices and tracking their activities in a single display. The platform hooks up with over 350 different patient devices via Bluetooth; physicians can create personalized patient-centric alerts based on data parameters specific to that patient's condition.

Routed through the platform's workflow management tools, the care team readily receives the health alerts, safeguarding prompt and proper response. Finally, the RPM solution displays real-time data trends to both the clinician and patient, empowering the tracking of patient adherence to care plans and monitoring of overall health.

Shared Purpose: Cost-efficient Quality Care

Automation and routing tasks across administrator and clinical user groups streamline operational and clinical workflows, promoting efficiencies at scale.

Hospital administrators can manage, view, and automate scheduling information from disparate systems across hospitals and healthcare systems. Digital workflow optimization eliminates organizational inefficiencies, including surgery coordination, care transition, digital triaging, and clinical trials. Through automation, Minerva enables appointment scheduling with the proper person performing the right work, empowering high-quality care. Moreover, the platform delivers secure and controlled patient data to affiliated clinical providers, facilitating automated and efficient referrals to physicians, post-acute care providers, and partner organizations, ensuring that the patient never experiences a lapse in care.

Minerva is a white-labeled HTML5 responsive web platform and application, allowing healthcare facilities to customize marketing and branding to offer a uniform user- and patient-facing solution.

The Path Forward

Frost & Sullivan believes that MphRx's Minerva strategically positions the company for long-term success. As a cloud-based, scalable, vendor-neutral, secure platform, it is a future-proof investment maximizing ROI. Customers can leverage solutions previously purchased and scale alongside healthcare needs. Furthermore, the company offers a subscriber model, so health organizations only pay for solutions and information storage as needed, optimizing value. MphRx partners with several health systems worldwide, including Northwell Health, NYU Langone Medical Center, United Healthcare Global, Parkway, Aster, Columbia Asia, and Dr. Lal Path Labs.

Conclusion

Healthcare organizations worldwide experience vast data silos due to interoperability issues between numerous vendors and information technology (IT) solutions. Information gaps hinder care decision quality, quick patient turnaround, efficient administrative and clinician workflows, physician collaboration, and remote patient monitoring.

Clearly recognizing the inefficiencies and frustrations for patients, providers, and administrators, MphRx created its innovative Minerva platform as a single solution blanketing across these key healthcare stakeholders to eliminate data silos, driving cost-efficient, quality care. The cloud-based, vendor-neutral, scalable solution facilitates interaction between disparate multi-vendor IT infrastructure resources. It normalizes and transforms data into a unified patient record (UPR), eliminating data silos.

Available, viewable, and usable enterprise-wide, patients, physicians, and administrators in the health network can leverage actionable insights to enhance patient's experience, drive patient engagement, empower personalized care decisions, and promote physician collaboration. As a result, Minerva's data analytics and automation streamline clinical and operational workflows while increasing patient satisfaction and improving outcomes. Frost & Sullivan recognizes how the platform offers healthcare organizations a scalable solution centered around high return on investment through quality care and patient interaction empowerment.

With its strong overall performance, MphRx, Inc. earns the 2020 Frost & Sullivan Global Enabling Technology Leadership Award.

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 Global 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
Criterion 2: Commitment to Creativity
Criterion 3: Stage Gate Efficiency
Criterion 4: Commercialization Success
Criterion 5: Application Diversity

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	• 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

	STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
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 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.