

Technology Innovation Award

Business Platform Services for Research and Commercialization of Oncology Products



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

FROST & SULLIVAN BEST PRACTICES AWARD

BUSINESS PLATFORM SERVICES FOR RESEARCH AND
COMMERCIALIZATION OF ONCOLOGY PRODUCTS - GLOBAL

Technology Innovation 2019

FROST & SULLIVAN

2019

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LUMISEEK
harmonizing ecosystems

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Background and Company Performance

Industry Challenges

Digital connectivity, exponential real-world data growth, policy changes, and innovative technologies are transforming the life science industry, which continues to pursue novel cancer therapeutics rigorously. The current research and development (R&D) investment trend costs an estimated \$2.7 billion globally and can take from 5.8 to over 15 years to bring a single cancer drug to the market.¹ Given the high R&D cost and time-to-market, there is a need for high-level networking between various stakeholders (e.g., drug development companies, hospitals, contract research organizations, and regulatory bodies) throughout the discovery, development, clinical trials, and commercialization processes—crucial to limit redundancy, lower costs along the value chain, and improve project success rates by creating greater efficiency and operational synergies.

Patient Recruitment Inefficiencies Limits Precision Medicine Trials

Collaboration is particularly relevant in clinical trials. A common oncology drug development challenge is recruiting enough patients for clinical trials. With advances in oncology research and precision medicine, there are multiple targeted therapies in the development stage, each requiring unique patient subsets (such as a specific gene set or mutations) for targeted clinical trials. Stratifying and recruiting specific patient sub-groups with unique conditions for targeted therapeutics clinical trials is a struggle for pharma and biopharma companies. Enabling seamless communication and collaboration are crucial to broaden the reach to diverse patient populations across the globe and improve patient recruitment, given the staggeringly low success rates, 3.4%, for oncology drugs.² With billions of dollars in oncology R&D powered by omics and molecular technologies, clinical trials show that combination therapies, usually from co-development, achieve better efficacy results; hence, implying collaborating across organizations and international borders are crucial.³

Frost & Sullivan believes that companies that internally develop combination therapies need to leverage artificial intelligence (AI)-driven platforms that can enable project collaboration to maximize the potential synergy of drugs for commercialization. There is an ever-increasing need for inter-organizational multidisciplinary cross-border integration of resources to drive efficient oncology drug development and improve patient recruitment, site selection, and in-trial monitoring.

¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5710275/>

² Chi Heem Wong, Kien Wei Siah, Andrew W Lo; Estimation of clinical trial success rates and related parameters, *Biostatistics*, kxx069, <https://doi.org/10.1093/biostatistics/kxx069>

³ *Artificial Intelligence Revolutionizing the Pharmaceutical Industry*, (Frost & Sullivan, November 2018)

Information Silos Prevent Collaboration

Currently, historical and new data, technologies, and people exist in silos in the oncology drug discovery and development landscape. Within a drug development organization, multiple departments and projects have their versions of the data; therefore, managing the spread of complex data, deriving insights, and translating the information into critical business decisions are difficult. At the same time, the entire oncology business realm does not connect comprehensively. There is no system to aggregate individuals and information to create a meaningful project, monitor overtime, and execute to end. Even the existing business social media platforms that connect individuals across the world are non-domain specific, thereby diluting connectivity and limiting seamless domain-specific reach. Current business social media platforms are user-centric, failing to represent in-depth business focus, vision, mission, and the goals of a life science organization. Additionally, the organization specific platforms do not interconnect for project-level global collaboration between oncology-specific companies.

Platform Interoperability Issues Create Inter-Organizational Information Gaps

Presently, each oncology drug development organization uses multiple Health Insurance Portability and Accountability Act compliant platforms at different levels for data exchange, such as innovation programs, clinical trials, and business level informatics. However, numerous fragmented systems within an organization lead to information gaps. A mechanism to integrate various platforms that apply to oncology research, drug discovery, development, and commercialization is absent. The challenge is to bridge this information gap between multiple sources (platforms) of data exchange with ease.

Even at the global level such as consortiums consisting of research institutes, pharma, and biopharma companies, effective communication exchange is missing. For instance, there are several clinical trial consortia of top-notch oncology institutes, hospitals, hospital systems, and drug development companies conducting precision medicine-based clinical trials. However, logistic enablement and information exchanges occur through emails; there is a lack of a collaborative network to integrate requirements between various key stakeholders. Frost & Sullivan concurs that cloud is becoming foundational to provide the much-needed collaborative infrastructure for converging healthcare technologies; hence, software-as-a-solution will be the dominant revenue-generating segment, while platform-as-a-service will trigger technology and business model innovation.⁴

Technology Attributes and Future Business Value of Lumiseek

Headquartered in San Diego, California, Lumiseek's breakthrough platform (also known as Lumiseek) is an online collaborative solution that provides an interface to align all the different organizational elements and stakeholders in the oncology community. Lumiseek connects organizations, consortiums, support groups, life science companies, and the

⁴Global Healthcare Market Outlook 2019,(Frost & Sullivan, December 2018)

clinical community in mutually beneficial partnerships. Beta tested for successful implementation, the platform does not require the Food and Drug Administration's approval as it does not inherently store patient related data in its databases. Rather it integrates with third-party software that specializes in sharing of patient-related data.

Creating a Virtual Global Oncology Innovation Ecosystem

The vision to develop the innovative platform stems from the CEO's observation of the siloed and fragmented information available to people in the oncology market. The Lumiseek platform integrates the fragmented data into a single unified infrastructure and bridges the gaps to streamline information flow. The platform also enables synergy between organizations and connects all the stakeholders in the value chain from the early phase of discovery (basic research) to the clinical practice. Utilizing AI and machine learning, Lumiseek will offer a visually intuitive interface that provides informatics services.

Drug development companies can leverage the platform to collaborate strategically, integrate requirements between stakeholders for logistical enablement, and exchange information. The system allows for the simultaneous execution of multiple projects and programs' in a single platform saving time and curtailing resource costs.

The solution is comprehensive in its ability to support the initiation of basic science, translational and clinical research projects between global stakeholders. For instance, the Platform's search features allow exploring organizations that are developing a new diagnostic using sequencing technology for a specific gene set to filter specific companies based on their capabilities, thus enabling collaboration for co-development. At the same time, it supports researching more general topics such as exploring companies manufacturing generic oncology drugs globally. Frost & Sullivan concur that Lumiseek's research features potentially allows companies to find and connect with relevant partners on unique capabilities such as genomics, immunology, nanotechnology, and proteomics for co-development of more efficacious combination therapies.

Lumiseek's platform is unique in allowing domain-specific connectivity and organization-centric representation instead of the traditional user-focused method. The solution accredits and validates all users; thus, rendering accountability and reliability in communication. All platform users provide a company-specific email to register; the platform validates the user, limits creating multiple accounts, and prevents non-relevant registration. While numerous collaborative, communications, and project management platforms exist in the general business space, Lumiseek is the only unified cutting-edge industry specific system enabling all three capabilities.

Shortening Time-to-market Increasing Potential Revenue Opportunities

While extensive investment goes into oncology drug development, companies will improve efficiency by leveraging various Lumiseek's capabilities, which translates into considerable

financial savings. The platform allows organizations to interact with professional groups, Integrate with partners, global institute networks to optimize time and lower overheads.

Highly trained biotechnology project management professionals are available as an optional service to assist in global project management, communication, and project monitoring to ensure that project timelines are met and investigators are in compliance with protocols.

The platform expedites project management—facilitates a seamless transition between various collaborative steps to shorten a drug's development time and hence the time-to-market. The overall impact of advancing project management will enhance commercialization efficiency—every day that a drug company saves on development allows for maximization of patent life and increases the potential for revenue generation per day. Frost and Sullivan concur that multiplying the additional revenue potential for all the drug development companies in the industry reflects, that the collective impact of improving efficiency through collaboration is exceptionally significant.

Supporting Collaboration for Early Phase Research, Translational Projects and Clinical Trials

The platform will potentially create a broader market for early phase drug development and thereby impact millions of people worldwide. Parallel to developing drugs, early on, the platform will enable the drug development companies to collaborate with institutes in the drug development lifecycle remotely. By leveraging Lumiseek, contract research organizations can grow their network and broaden their reach to more customers and organizations. Collaboration enhances proof-of-concept and clinical trial participation of institutes in other parts of the world (developing countries). At the same time, Lumiseek connects hospitals with similar patient groups across the globe (even unrepresented regions) to enable very efficient recruitment of specific patient subsets. Even small and mid-sized companies will have the bandwidth to recruit the required patient number and advance clinical trials smoothly. Frost & Sullivan believes that Lumiseek is disruptive because it engages all stakeholders in the healthcare community and revolutionizing the patient recruitment model for oncology clinical trials.

Enabling Global Oncology Project Management Expanding to Other Therapeutics

In the current year, the company intends to connect more than 3,000 oncology-specific organizations and facilitate enormous data exchanges in the ecosystem. The system will have all individuals and organizations representing their back-end database in a visually impactful manner. As the next-generation business social media for the oncology domain, the platform can connect various stakeholders to collaborate, creating synergies to execute group-level or consortium-level projects; in case of partnerships, it will allow life science companies to synergize multiple activities across the drug development lifecycle jointly. In view of the tremendous impact on communication across the industry, the CEO points out that Lumiseek is *"the next frontier of social media and business project*

management coming together” in the oncology domain. The CEO believes that the platform merges the capabilities of LinkedIn, systems applications and products in data processing into a single system and thereby keeps pace with the digital healthcare revolution.

Currently, Lumiseek serves clients in the United States and India but will expand its presence globally. The company strives to add exponentially more organizations around the world and cover the entire oncology industry within 2 to 3 years. Apart from geographic scalability and reach, the platform can expand to other therapeutic segments like cardiology and gastroenterology. Owing to its malleable nature, Lumiseek provides a template for all healthcare domains and ecosystems involving rapidly evolving technologies.

Partnering with Oncology Consortia and Clusters for Growth

Lumiseek’s goal is to have 6,000 to 7,000 organizations in its platform and provide access to an organization’s specific users to build a robust oncology ecosystem. Currently, the company targets small to mid-sized biotech companies, collaborating with 5 to 10 organizations at a time. In the coming years, it will focus on big pharma, universities conducting academic research, and hospitals that aim to network and integrate with academic and biotech companies.

By focusing on clusters, consortia, and social media platforms, the company builds and links various global consortia through its Lumiseek platform, thereby creating brand equity in the process. The platform provides seamless interoperability—other applications and platforms can integrate and plug-in to it with ease. The interoperability allows other platform users and customers to use the Lumiseek system automatically, broadening global reach to create a win-win for all stakeholders. Platform-level interconnectivity enables teams to have one-to-one outreach.

As part of its customer acquisition strategy, the company developed AI algorithms to target the right customer profiles to create a reach-out database. Additionally, Lumiseek leverages social media platforms (e.g., LinkedIn) to educate stakeholders and create awareness in oncology groups about its platform’s potential benefits. The company is forming consortia in San Diego and getting groups of different organizations in the platform. Lumiseek plans to reach out to large initiatives and projects that would potentially leverage its mechanism. Potential, early adopters include the WIN Consortium, VCR Park India, and Smart Africa, a government initiative where the platform will enable them to reach the next level in healthcare research by collaborating with key stakeholders in Africa.

Conclusion

The healthcare oncology ecosystem is not adequately equipped to facilitate seamless data interoperability across industry stakeholders. The lack of a cross-border inter-organizational collaboration challenges efficient conduct of translational research projects and patient recruitment for clinical trials in the precision oncology medicine market. High research & development costs and a long time-to-market for oncology drugs necessitate seamless networking between various stakeholders to interconnect information siloes, lower costs, and improve projects' success rates.

Lumiseek bridges the information gaps by facilitating industry-level collaboration to manage logistics globally and create greater efficiency and operational synergies. The online Lumiseek platform maintains and manages the intricate relationship between all the stakeholders such as regulatory bodies, research organizations, drug development companies, and hospitals. By integrating with partners' technologies and providing a seamless transition between various collaborative steps, the platform shortens drugs' time-to-market, significantly enhancing potential revenue opportunities for drug development companies. The platform unifies multiple data platforms and information sources across organizations while enabling continuous communication within and across organizations, facilitating global oncology project management for drug discovery, development, clinical trials, and commercialization strategies.

With its strong overall performance, Lumiseek earns Frost & Sullivan's 2019 Global Technology Innovation Award for its transformative business services platform that will enable exponentially more productive and efficient research and commercialization of oncology products.

Significance of Technology Innovation

Ultimately, growth in any organization depends upon finding new ways to excite the market and upon maintaining a long-term commitment to innovation. At its core, technology innovation, or any other type of innovation, can only be sustained with leadership in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.



Understanding Technology Innovation

Technology innovation begins with a spark of creativity that is systematically pursued, developed, and commercialized. That spark can result from a successful partnership, a productive in-house innovation group, or a bright-minded individual. Regardless of the source, the success of any new technology is ultimately determined by its innovativeness and its impact on the business as a whole.

Key Benchmarking Criteria

For the Technology Innovation Award, Frost & Sullivan analysts independently evaluated two key factors—Technology Attributes and Future Business Value—according to the criteria identified below.

Technology Attributes

Criterion 1: Industry Impact

Requirement: Technology enables the pursuit of groundbreaking ideas, contributing to the betterment of the entire industry.

Criterion 2: Product Impact

Requirement: Specific technology helps enhance features and functionalities of the entire product line for the company.

Criterion 3: Scalability

Requirement: Technology is scalable, enabling new generations of products over time, with increasing levels of quality and functionality.

Criterion 4: Visionary Innovation

Requirement: Specific new technology represents true innovation based on a deep understanding of future needs and applications.

Criterion 5: Application Diversity

Requirement: New technology serves multiple products, multiple applications, and multiple user environments.

Future Business Value

Criterion 1: Financial Performance

Requirement: Potential is high for strong financial performance in terms of revenue, operating margins, and other relevant financial metrics.

Criterion 2: Customer Acquisition

Requirement: Specific technology enables acquisition of new customers, even as it enhances value to current customers.

Criterion 3: Technology Licensing

Requirement: New technology displays great potential to be licensed across many verticals and applications, thereby driving incremental revenue streams.

Criterion 4: Brand Loyalty

Requirement: New technology enhances the company's brand, creating and/or nurturing brand loyalty.

Criterion 5: Human Capital

Requirement: Customer impact is enhanced through the leverage of specific technology, translating into positive impact on employee morale and retention.

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.

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>.