



2017 Frost & Sullivan Predictions in Digital Health

A Frost & Sullivan White Paper

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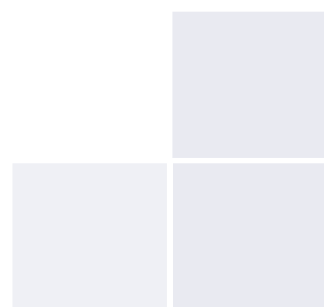
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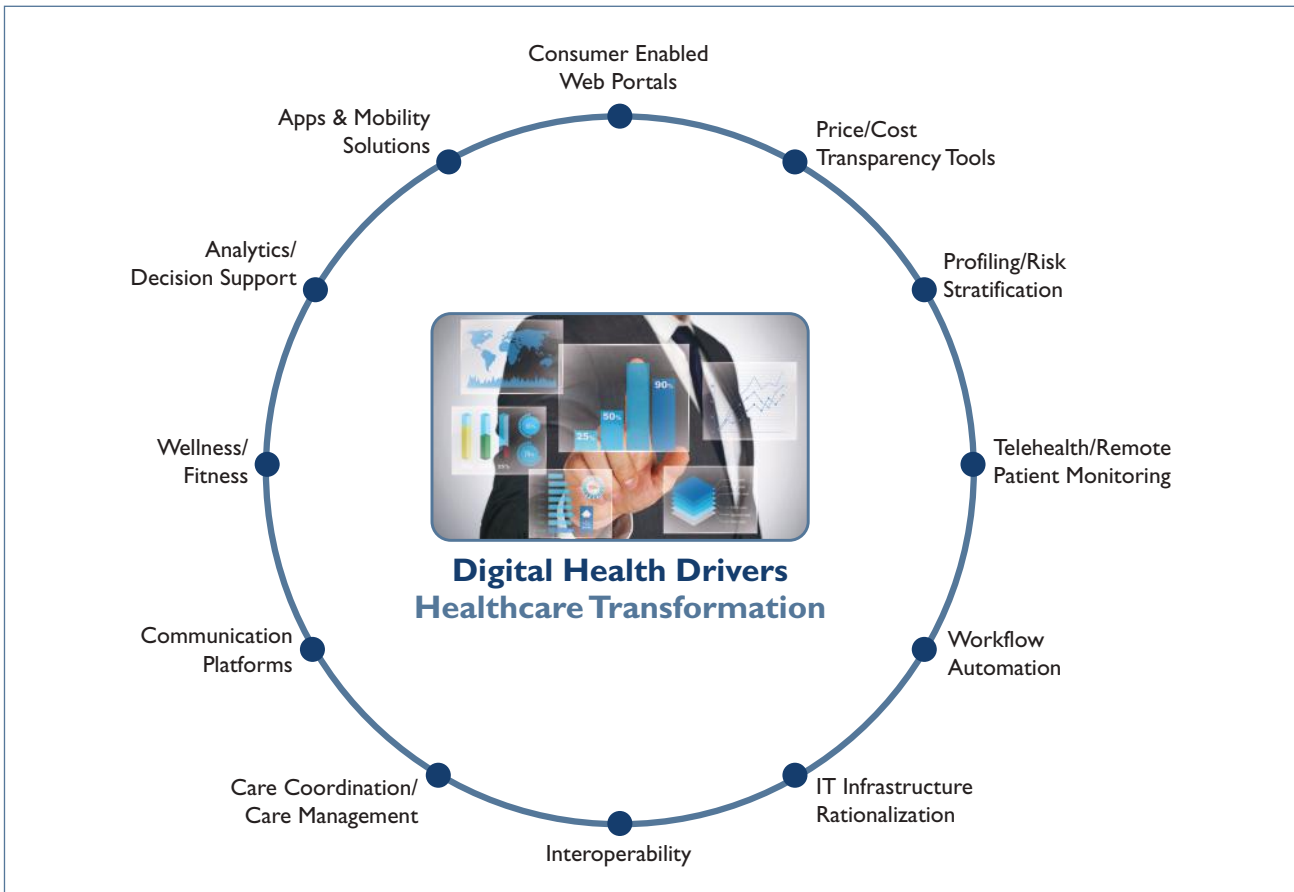
INTRODUCTION

Frost & Sullivan provides comprehensive coverage of numerous information technology products, services, vendors, and regulatory developments impacting global healthcare markets. In this report, our Digital Health team weighs in with its six top picks for key US industry trends to look out for in 2017:

- The Impact of a Potential ACA Repeal on Health IT Purchasing
- How Telehealth Markets Continue to Gain Momentum
- The Importance of Analytics as an Enabler of Value-based Care
- Digital Health Platform Interoperability and the Rise of Voice Computing
- The “Quantified Self” Moves Toward Official Recognition and Reimbursement
- How New Interoperability Efforts are Creating a Real Health IT Ecosystem

What is digital health?

This refers to a vast market of information technology applications, platforms and services leveraged by healthcare providers, payers, med tech and life sciences companies, patients, and consumers. The digitization of healthcare brings new growth opportunities for participants from a wide range of areas given the complexity of the value chain of digital health solutions. Consequently, digital health is highly dynamic and fast moving, and sits at the intersection of multiple major vertical markets, including healthcare, the information communication technologies space, automotive, and many others.





In 2017, US hospitals will aggressively step up efforts to streamline costs in the face of potentially catastrophic financial consequences of an Affordable Care Act (ACA) repeal or revision. Key business survival strategies will include expanded M&A, delayed purchasing of non-essential IT, and considerably tougher price negotiations with technology vendors.

The health IT market has been full steam ahead since the passage of HITECH in 2009 and ACA in 2010. Although needed changes in the automation of healthcare have been an important market driver as the industry has played catch-up with IT adoption, federal policies have also played a crucial role in establishing and sustaining the dramatic upward trajectory of this market. Now, Washington is focused on repealing and replacing the ACA. The implications for the overall US health IT market could be very significant.

We've all heard the admonition that markets don't like uncertainty. And when it comes to new IT investments by hospitals and physicians for at least the first half of 2017, we predict that providers will hit the pause button on a good chunk of new IT purchasing until a clearer path on the direction of reform emerges. Presuming that any new health plan will take time to work through the legislative process (we are now hearing nothing significant will happen until 2018 at least), let's recap some of the most potentially disruptive direct impacts from an ACA repeal or revision, whenever this might happen. First, repeal could interrupt or even halt health insurance coverage for almost 20 million Americans. For those people that remain insured, payers could almost immediately start pushing back on the basic benefit packages required by ACA if those requirements are loosened or done away with. Another concern is that consumers may just stop paying their premiums if they believe they won't

be penalized for lacking health coverage. This means that providers face a real risk of not being reimbursed for services rendered, thus significantly impacting their already fragile financial standing.

Overall, ACA has improved the financial outlook for most hospitals. During the 2008 recession and prior to ACA, the aggregate hospital profit margin fell to about 2.6%, according to the Congressional Budget Office (CBO). Today, the CBO says that the average profit margin across US hospitals is about 8.3%, with about 25% of hospitals exhibiting negative profit margins. ACA reduced increases in Medicare payment rates for most hospitals, but potentially substantially (and continually) increases the number of people with health insurance.

Hospitals have thus been counting on these new customers to improve their financial health by reducing the rate of (previously) uncompensated care. And here's another important point to consider: since the passage of ACA, many hospitals have aggressively embarked on new capital expenditures to improve facilities, purchase physician practices, and deploy new IT solutions like EHRs. Any significant disruption in the flow of insured patients could decimate hospitals financially, and at a time when there are many new bills to pay. In fact, a recent study by the Urban Institute suggests that US hospitals could stand to lose \$166 billion in next decade due to ACA repeal.

So where do we stand in terms of what this means for health IT in 2017? The good news is that the basic trajectory of digitally enabled healthcare transformation will, ultimately, stay the course. Many new technologies will continue to flourish, especially those focused on telehealth and consumerism.

Providers must continue efforts to reduce costs, expand access, and improve quality, and this will inevitably require continued investments in next-generation EHRs and RCM solutions, new cybersecurity IT, data analytics, and other core health IT solutions. However, in the short term, expect that many hospitals are going to be focused on just surviving rather than thriving and innovating. These providers will need to focus the bulk of their capital investments on retaining core services, needed staff, and clinical specialists.

Frost & Sullivan predicts that the large health IT vendors like Epic, Cerner, Allscripts, GE, and McKesson will likely face the most difficult business environments as their customers delay or even permanently push back on some purchasing in the face of declining revenues. And expect price negotiations to get very tough in the months and years ahead. Furthermore, a pause in IT purchasing, even for just the first half of 2017, could put in place more permanent downward price pressures that will be hard to reverse.

The fact that many existing hospital software contracts that were put into place in the early years of HITECH and ACA (2010, 2011) are now expiring at a time of great financial uncertainty for providers also complicates new contract negotiations. Of particular concern is that uncertainty about where we are headed with CMS programs like value-based reimbursement and bundled payments (newly appointed HHS Secretary Dr. Tom Price does not like bundles) could stall purchasing on new population health IT. Finally, in the face of all this financial uncertainty we can, and should, expect providers to once again aggressively accelerate consolidation efforts to improve shrinking margins.

As is always the case, more M&A will also complicate the IT purchasing environment, creating many new winners and losers, and disrupting established relationships enjoyed by many vendors.



Telehealth is approaching a promising year in 2017 following substantial progress in 2016. In 2016, payers came onboard to offer virtual visits as an enterprise plan option to eligible employees. In remote patient monitoring, traditional medical device manufacturers are beginning to feel some pressure from the many startups offering smaller, integrated and easy-to-use devices that are managed by smartphone apps. mHealth is increasing as the enabler that will drive connectivity and continue to influence the realization of a functional Internet of Medical Things.

The major challenge in 2017 and moving forward will be to quantify the value of these services and devices,

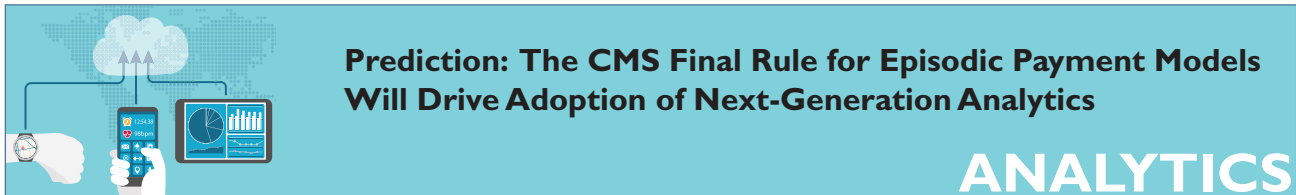
and demonstrate how they support the goals of the US healthcare system to improve healthcare outcomes while reducing costs.

Some specific telehealth predictions for 2017:

- The schism between medical-grade and commercial devices will begin to erode. High-end activity trackers from companies like Withings will offer quality, easy-to-manage patient tracking at a lower cost.
- Larger device manufacturers will seek to acquire many of the new entrants to improve the economics of remote patient monitoring.

- Telehealth communications platforms, including asynchronous services that permit patients and physicians to communicate on an ongoing basis, should have a good year.
- Remote patient monitoring will break free of the current focus on chronic condition management and demonstrate value in ongoing care management to all age groups.
- Virtual visits will continue to increase as the business model continues to become an enterprise plan benefit.
- In contrast to 2016, when two negative studies were published early in the year, there will be positive indicators published in peer-reviewed medical journals.

Although we can expect regulatory debates in 2017, the benefit of connecting patients to providers will continue. Perhaps the biggest challenge that will be tackled more aggressively will be the need to de-emphasize the term telehealth and concentrate instead on the value associated with replacing haphazard in-person care with a patient-engaged continuum of care.



Healthcare analytics is widely regarded as a key enabler of value-based care. Robust usage of this technology allows health systems to practice data-driven decision making, which improves operational efficiencies, eliminates preventable costs, and streamlines clinical effectiveness. However, analytics adoption among US healthcare payers and providers is not consistent; healthcare organizations embrace a diverse array of deployment strategies that demonstrate different implementation maturity levels. For example, some health systems might utilize advanced enterprise data processing architecture to derive patient-specific insight for every episode of care, whereas others still rely on basic reporting capabilities of legacy business intelligence (BI) tools. This year, the cumulative maturity of the US analytics market is likely to be streamlined, mainly due to timely intervention from CMS.

In late 2016, CMS launched the final rules for bundled payment programs, bringing great joy to analytics vendors that now anticipate higher traction from payers and providers. On the contrary, the end-user segment is still apprehensive about the feasibility of this new rule, which

mandates that US providers in some regions accept financial accountability for the quality and cost of every episode of cardiac and orthopedic care. The scope of the new rule combines all patients being treated and all patients during the 90-day post-discharge phase, thus encouraging effective care coordination between acute care hospitals, physician practices and post-acute care providers. Providers managing to demonstrate episodic cost utilization below the CMS benchmark are likely to be incentivized and others are likely to be penalized.

Regardless of this initiative's longevity amid political intervention and provider outburst, in 2017, healthcare organizations are likely to accelerate adoption of best-in-class analytics solutions, mainly for quality reporting, which is an integral component of value-based care and population health management. Providers are most receptive to using analytics solutions to identify, assess and benchmark cost trends by payer, patient and physician mix, whereas payers are likely to opt for these solutions to identify quality-adjusted target prices for every episode of care.

In addition, a higher number of specialty-specific analytics solutions will gain prominence amid a growing need to benchmark disease-specific cost utilization. The increasing adoption of specialty-specific analytics solutions among progressive providers who are attributing high net patient revenue to bundled payment programs will be a reality in 2017 and beyond. Providers will likely use these solutions extensively to assess clinical utilization trends and financial coverage options of defined patient populations for which they, as part of their bundled payment arrangements, are attributed to share risk/reward. Traditional and non-traditional analytics vendors will embrace ecosystem-level partnerships, but through completely different ways. Due to ongoing interoperability issues, large, value-based healthcare systems are compelled to utilize multiple analytics partners for comprehensive patient data analysis at an enterprise level.

This industry challenge necessitates traditional and non-traditional vendors to embrace ecosystem-level partnerships for development of next-generation health analytics solutions that are agile, IT agnostic, scalable, and

remotely manageable. However, a close assessment of such strategic alliances reveals that a variety of business objectives are in play. Smaller, vertical-specific analytics vendors aim to remain vendor agnostic for achieving superior scale among many US healthcare providers that prefer to access EHR-integrated analytics modules for decision support at point of care. Hence, they tend to leverage open APIs of large EHR vendors and co-create solutions for specific EHR ecosystems. In contrast, mature analytics vendors embrace partnerships to strengthen functional expertise in the areas of readmission management and cost benchmarks. Finally, nontraditional analytics vendors, after assessing growth opportunities around analytics-led episodic care management, often decide to build proprietary solutions through provider collaboration or opt for M&A strategy.

Overall, Frost & Sullivan predicts that the growing adoption of alternate payment models coupled with the after effects of CMS's recently launched bundled payment programs will drive usage of analytics solutions for episodic cost management.



The user experience aspect of digital health is tough and may be getting tougher, particularly as it pertains to enabling seamless interoperability and mobility. Today, both consumer and professional “users” are faced with an ever-growing landscape of devices, applications, vendor platform choices, IT integration challenges, and other issues as they struggle to construct their own ecosystem that will help them find cohesive value from various digital health tools.

We are all aware of problems arising from IT “platform wars” with prominent examples such as Apple versus Samsung, Fitbit versus Jawbone, and such. This year,

the platform battle is about to move into a new dimension—voice. Frost & Sullivan predicts that digital health stakeholders will be paying close attention to the emerging battle between Amazon’s Alexa versus Apple’s Siri and similar disparate AI-enabled voice interfaces emerging in the market.

Voice computing interfaces are gaining prominence in consumer home markets as well as increasingly being positioned for use in healthcare, both at home and potentially in hospital. For example, Amazon Echo and Alexa, initially launched in 2015, were a surprise success with consumers during the 2016 Christmas season.

Echo was also highly touted at the recent Consumer Electronics Show (CES) in Las Vegas at the beginning of January 2017, where a variety of companies were showcasing Alexa's capabilities as part of their own platform components. Philips featured Echo at its CES booth as part of its maternal and infant care line under Avent, showcasing how Alexa can interface with Philips's Avent uGrow application. At CES, the presence of Echo was also seen as part of portfolios in connected home and aging-in-place system vendors, as well as elsewhere on the floor. In our opinion, the emergence of the importance of AI-enabled voice computing was, in fact, one of the takeaways from CES in 2017, surpassing the buzz around wearables, augmented reality, or even drones.

So what does this important market trend portend for digital health, and how is the conversation about platforms and voice interfaces evolving? Digital health is really about creating an ecosystem surrounding the user. In other words, digital health users increasingly desire a cohesive and flexible experience leveraging different sensors, devices, applications, and more operating off a single, flexible, interoperable platform. But that's not the reality. Today, every platform is different in digital health and, increasingly, in new voice computing solutions where users will be faced with more than one type of interface.

For example, if a person has a Nest as part of a connected home environment, they can interface that with Alexa. However, Nest, since being acquired by

Google, is now blocked from integrating with Apple HomeKit. If a person wanted to be an Apple-only user in terms of potentially leveraging voice interaction via Siri with that home device, they could not because of competitor conflicts. If a person wants to ask a question via voice through Alexa, it won't latch to something potentially in Apple Health and some of that data isn't verbally enabled to be answered by Siri. For example, Siri won't verbally answer how many steps you have taken today from Health, but you could get Alexa to answer stats from your Fitbit given Fitbit's integration with Amazon. So, overall, things are really complicated and will remain so as companies continue to wall off components and block users from optimal flexibility.

So, which voice platform is emerging as a market leader for digital health? While the app ecosystem continues to expand in Amazon's platform, further growth is needed in health and wellness-specific applications. We would expect other digital health solution vendors to potentially leverage Amazon's interface and explore new capabilities for voice as part of their push to improve user experience. While some may feel that people will ultimately prefer whatever voice AI interface is on their phone, we think that is still up for debate and that user preferences will likely change based upon location, circumstance, need, and how each person has built their tech experience. Over time, we predict that AI personas like Alexa, Siri or Jarvis will emerge as important stakeholders in health and patient engagement.



Prediction: Quantified Self Moves Toward Reimbursement

QUANTIFIED SELF

"Quantified self" or self-tracking refers to the use of technology to track and record various aspects of a person's daily life such as steps taken, food intake, type and amount of sleep, physical states such as moods and blood-oxygen levels, and other metrics related to health

and well-being. In 2016, 36 connected health apps and devices received clearance from the FDA. The majority of these approvals were for monitoring devices, but also included an increasing number of mobile medical apps and software.

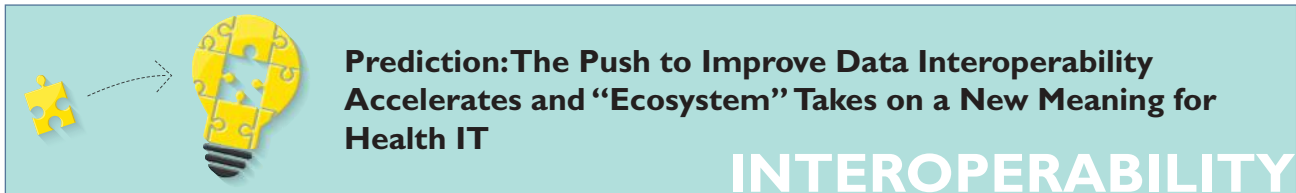
The thin line between wearables, health apps and medical devices is blurring. Today, technology vendors are focusing on integrating clinical, fitness and wellness dimensions to take advantage of growing interest among consumers in self-tracking. However, scaling the quantified-self business in healthcare without involving payers and providers is near-impossible. That's why plugging the data tracked at home and workplaces into the healthcare value chain and providing valuable inputs that can be reimbursed by payers will mark the next phase of quantified-self in healthcare. This is an exciting new development in this emerging market.

Frost & Sullivan predicts that 2017 will see the mainstream clinical adoption of consumer-facing trackers and apps as they become FDA-regulated and provider-prescribed solutions. The trend has already started as Medicare has begun to pay for blood glucose meters, diabetic intervention programs powered by digital scales, and virtual tele-coaching sessions. However, it is important to realize that the devices and apps that can truly achieve lasting market success must demonstrate clinically proven efficacy and cost savings.

The market will be highly attractive with growing opportunities for technology vendors that integrate data from consumer-facing applications into payer and provider health IT ecosystems.

Of particular interest will be vendors that can enable:

- Valuable inputs on social determinants of health
- Round-the-clock monitoring capabilities
- Early detection or prediction of diseases based on physical and behavioral patterns
- Inputs for telehealth consultations
- Seamless data flow to patient's medical record from smart phones linked to wearables
- Gamification applied to clinical use by physiotherapists mapping a personalized gaming routine to Xbox or Playstations at home



Prediction: The Push to Improve Data Interoperability Accelerates and “Ecosystem” Takes on a New Meaning for Health IT

INTEROPERABILITY

By definition, an ecosystem is dynamic and encourages its own expansion by allowing foreign elements to either evolve naturally or enter from the outside. However, healthcare IT systems hardly adhere to these characteristics, especially when we think about the more than 95% of US hospitals that support an EHR but do not exchange information. So, in healthcare we haven't really yet seen true IT ecosystems. In fact, the current (poor) state of healthcare interoperability standards can be compared to the state of web and Internet standards back in 2000 when leading enterprise IT vendors publicly touted collaborative efforts toward building standards but tended to tweak specifications at the back end just

enough to ensure each protected its share of the IT pie. The trend continued until there was significant standards revision and market consolidation. The good news is that the non-interoperability status quo in healthcare is about to change because there is widespread acknowledgement that healthcare transformation enabled by technology depends upon collaborative data exchange. Consequently, an industry-wide push for interoperability among healthcare stakeholders has been gaining momentum exponentially every year. A dramatic change in 2016 was the establishment of the Carequality-CommonWell partnership whereby CommonWell announced that it will implement Carequality standards for all its members.

Vendors spread across these two organizations cover over 90% of acute EHR and 60% of the ambulatory EHR market. Last year also saw rapid adoption of HL7's FHIR (Fast Healthcare Interoperability Resources) standard to improve data exchange. And exciting new developments promise to improve things further. Frost & Sullivan predicts that 2017 will see the launch of the FHIR normative version, a standard that is already being adopted by vendors for new application development and is expected to be widely accepted by multiple industry stakeholders. In parallel, providers believe that standardization of application programming interfaces (APIs) is the most appropriate method for improving interoperability.

But what does this mean from a business perspective for vendors? Historically, we have seen that systems integration can account for a significant portion of IT spend on the providers' part. For example, integrating EHR data into another hospital application starts at \$2,5003 per application and increases based on the legacy systems at the facility. Similarly, cumulative costs of integrating medical devices into an EHR can cost as much as \$10,000 per bed⁴ in one-time cost along with annual maintenance fees built on top. Thus, data integration services alone generate revenue worth upward of \$860 million per annum in the US. Compound that based on Metcalfe's Law⁵ and the value of a closed health data

network can build multifold as vendors lock providers and patients into their (closed) ecosystems.

Going forward, expect the industry's push for greater interoperability and potential financial penalties for data blocking to negatively impact some IT vendor revenues as the healthcare industry encompasses a more open and expansive concept of the term "health IT ecosystem." The increasing demand for interoperability will thus have an extremely perceivable impact on vendor revenues.

Many vendors have been preparing for the business impact of the interoperability transformation by setting the stage for next-generation apps and solutions that focus on clinician experience, precision medicine and consumer data. This is in line with embracing the concept of Patient Centricity in the sense that more power for self-health management is awarded to the patient, and both vendors and healthcare providers make money by providing high-quality services to the patient.

The lack of interoperability among healthcare stakeholders is not just a technology issue—there are important cultural and business competition issues to consider as well for both vendors and providers. Thus, today, it is the providers who now need to think about how they should trust and interact with industry peers to remain relevant in the era of open information exchange.

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1. Projecting Hospitals' Profit Margins Under Several Illustrative Scenarios;
http://www.cbo.gov/sites/default/files/114th-congress-2015-2016/workingpaper/51919-Hospital-Margins_WP.pdf
 2. Implications of Partial Repeal of the ACA through Reconciliation;
<http://www.urban.org/research/publication/implications-partial-repeal-aca-through-reconciliation>
 3. <http://www.healthitoutcomes.com/doc/how-much-will-an-ehr-system-cost-you-0001>
 4. <http://www.westhealth.org/wp-content/uploads/2015/02/The-Value-of-Medical-Device-Interoperability.pdf>
 5. Metcalfe's Law: The value of a network increases exponentially with increasing number of nodes.

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.



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