

Digital Business Ecosystems

An evolutionary leap
in value creation



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G R O U P

In a world where everything is connected, everything matters. Today's connections mean ever expanding, richer networks are emerging. They're called Digital Business Ecosystems, and they represent a radical shift in the most fundamental aspects of creating new value.

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The Tipping Point

International Data Corporation (IDC) estimates there are 9.1 billion connected "things" today, with projections of 28 billion by 2020 and over 50 billion by 2025. World-wide, the continuously expanding Internet of Things (IoT) ecosystem is enormous. Valued at \$655.8 billion in 2014, it is expected to represent \$2 trillion of economic impact in the next decade.¹

Further evidence of just how dramatic this trend will become starts to stretch our imagination beyond the bounds of reasonable comprehension. In his recent book *The Gen Z Effect*, Thomas Koulopoulos, Chairman of Boston-based think tank Delphi Group, has projected that, with user computing devices increasing since 1960 by one order of magnitude in each decade, by 2100 there will be 100 times as many individual computing devices and sensors connected to the IoT as there are grains of sand on all of the world's beaches.² That creates an almost inconceivably large network of devices that will connect virtually every object and person on the planet.

Ray Kurzweil, famed inventor, Founder of Singularity University, and Google's Director of Engineering, has taken that notion even further to suggest that the rate of increase in computing power and proliferation is not just exponential, but also accelerating in its exponential growth, approaching what he calls "The Singularity"—a point at which we will have virtually unlimited power, storage, bandwidth, and ubiquity of computers and sensors.³ The implications of this

accelerating exponential growth are beyond revolutionary; they disrupt the very foundation upon which we build business, economies, and society.

The world where everyone and everything is connected has arrived. And along with it comes an entirely new way to look at how businesses operate - Digital Business Ecosystems.



There are certain things in the future that you know will happen. The real challenge is figuring out what's possible now and how exactly do you make it... These big computing platforms [Oculus] come around every 10 years. I think it's time to start working on the next one... We're serious about doing this the right way and building out these ecosystems. (2015)

- Mark Zuckerberg

Digital Business Ecosystems are an evolutionary quantum leap in how industries are being transformed from disconnected entities to networks of strategically aligned and intensely collaborative communities. These hyperconnected communities tear down the boundaries between companies and within industries as well as those

between customers and suppliers. The walls that separated the myriad participants in a process are dissolving into bits and bytes as they turn into the digital glue that holds ecosystems together. Gartner calls it the “death of distance”.⁴ Without the constraints of geography and the simultaneous collapse of the time it takes to collect information and to connect to resources, people, and processes, we are experiencing the emergence of a real-time world in which opportunity is separated by just nanoseconds from new business models to monetize it. Take for example the rise of cloud sourcing⁵ and cloud funding platforms such as Indiegogo and Kickstarter as a way to launch new businesses with zero up-front capital and in a fraction of the time that would normally be required to ramp up a new business model.

Change is accelerating. Just as Nicholas Negroponte, founder of the MIT Media Lab predicted in 1984,⁶ industries, products and services are converging and reforming as digital connections cross industries and populations at a rate that takes your breath away. In this new reality businesses don't just change every so often, therefore they need to be architected and built for change!

This is not the future; it is here today. You only have to look at the headlines to see it's already happened!

Just a few years ago, upstarts like Uber & Airbnb revolutionized the taxi and hospitality industries. Many other fascinating alliances and notable strategies for leveraging new Digital

Business Ecosystems have continued to alter the landscape since. IBM's strategic partnership with Under Armour to release the UA Record™ application, which combines IBM Watson analytics and data with fitness data collected through the UA community, to energize customer engagement is just one of many examples.^{7,8}

The ecosystems trend is also not just isolated to business partnerships. It is becoming pervasive in nearly every aspect of modern society. For example, Digital Business Ecosystems are shaping the strategy of major corporations such as GE, which announced a dramatic decision to move their headquarters to Boston in order to access the existing ecosystem of universities.⁹



The battle of devices has now become a war of ecosystems... our competitors aren't taking our market share with devices; they are taking our market share with an entire ecosystem. This means we're going to have to decide how we either build, catalyze, or join an ecosystem. (2015)

- Stephen Elop, CEO of Nokia

The brilliance of GE's move is not the relocation (which seems to fly in the face of a globally connected ecosystem), but rather that they are leveraging an existing network of exceptional

talent (recognized for innovation and imagination) within the unique ecosystem of universities that already exists in a state where technology thrives and leaders are embracing the intentional architecting of the future—echoing GE's greater strategy of being at the center of a vast orchestrated Digital Business Ecosystem. While relocation may seem counter-intuitive in a world of hyperconnectivity, GE illustrates the strategic imperative of considering the real world. When you pull back and look at their larger objectives the reason for the move becomes obvious. The big shift in Digital Business Ecosystems is building, participating and strengthening the entire ecosystem for the shared benefit of all through strategic alignment.

All of this is pointing to a new era of hyperconnected organizations that are making the concept of ecosystems central to their strategy and growth. And yet, we are still at the very beginning of this phenomenon.



Interoperability has become so omnipresent that entire business ecosystems can be digitally represented, enabling profoundly improved productivity and customer experiences.

- Gordon Earle, CEO of Arrayworks

The Economic Impact of Connecting Everything and Everyone

This proliferation of technology is rapidly reshaping our society and economy. A recent article by Forbes Tech “The Rise of Digital Ecosystems in the We Economy” describes how ecosystems create a new era of digital orchestration: “The new power brokers will be the master orchestrators that place themselves at the center of these digital ecosystems. These leaders will quickly master new digital relationships with their customers, end users, suppliers, alliance partners, developers, data sources, makers of smart devices, and sources of specialty talent. All will share the same goals: to grow new markets... and their individual businesses.”¹⁰

In short, by drawing on ever-increasing connected communities and by mobilizing disparate and historically disconnected resources, digital ecosystems create a new framework for the economics of competition. With every significant shift, there will be winners and losers: those who recognize the value of Digital Business Ecosystems and build their business around them, and those who don't. The evidence is already clear that the same old methods of doing business no longer work; they simply increase the burden of complexity under which many businesses ultimately fail.

Just look at the accelerating “topple rate” – the rate at which companies fall off or “topple” from the Fortune 500 or Global 2000 list. Every year for

the past 12 years, approximately 21 companies vanished from the Fortune 500 list, reflecting a turnover of nearly 70% over the past 20 years alone. The average time spent on the Fortune 500 is accelerating downwards: currently at 14 years on average, down from 35 years in 1970.¹¹

Add to this the fact that we are quickly approaching a point of universal access to the Internet, creating a global economic engine that will add billions to the workforce—again, without regard to geographic location—and it's clear that the way we source and manage talent will require the ability to orchestrate resources that no longer conform to traditional notions of organizational or even national boundaries.



The new power brokers will be the master orchestrators that place themselves at the center of these digital ecosystems. These leaders will quickly master new digital relationships with their customers, end users, suppliers, alliance partners, developers, data sources, makers of smart devices, and sources of specialty talent. All will share the same goals: to grow new markets... and their individual businesses.¹²

The economic impact of Digital Business Ecosystems and their ability to accelerate the creation of economic value will be profound. In a recent Forbes article Janus Bryzek, the father of sensors, was quoted as saying that, “the “Industrial Internet has the potential to add \$10 to \$15 trillion (with a “T”) to global GDP over the next 20 years, and Cisco [is] increasing to \$19 trillion its forecast for the economic value created by the “Internet of Everything” in the year 2020. This is the largest growth in the history of humans”.¹²

When you consider all of the evidence, it's clear that the ecosystem phenomenon will be the defining factor in business competition and the economy at large over the next 100 years, changing the landscape of business as radically as the industrial revolution changed business over the last 200 years.



Architecting Ecosystems

Haven't businesses always been part of an ecosystem with suppliers, partners, alliances, government regulators, and customers? Yes, but traditional business ecosystems evolved organically, meaning they grew randomly and opportunistically as the market grew. Organic ecosystems create large amounts of friction and inefficiency among its participants.

Giants such as Ford, which has over 40,000 partners and suppliers, or Walmart, with 70,000 suppliers, created steep barriers to entry through their processes and dictated strict conformance to them from their suppliers. The enormous burden of this complexity created business processes that were more like fortresses, designed to keep competition out.

Yesterday's approach served the industry titans exceptionally well since it made entering their markets, and threatening their leadership, nearly impossible without significant capital investment from the outset. Yet, every industry - from banking and finance to healthcare to education - has been shackled by complicated ways of doing business that ended up permeating the industry like the fat in ground beef. In each case however, the ultimate casualty was innovation.

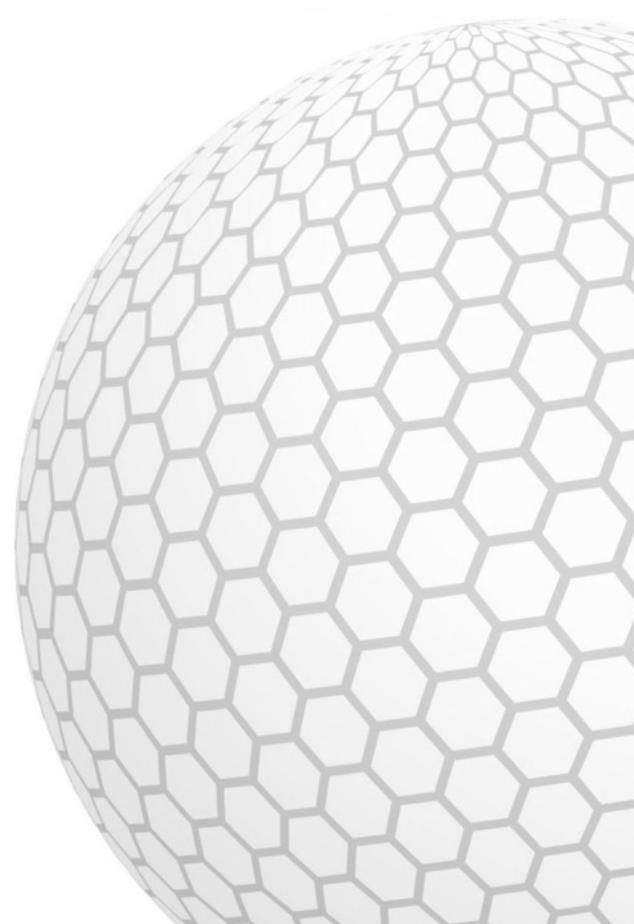
Conversely, today's Digital Business Ecosystems (with emphasis on the word Digital) are intentionally architected to minimize friction, increase the utilization of assets, and accelerate

innovation through higher levels of collaboration, ultimately removing latency, inefficiency, and costs. It's these architected ecosystems that are taking center stage and which are becoming the new engines of innovation.



It is critical to redefine how you interact with your entire business ecosystem... Welcome to the cognitive era.... to think fast, move faster. (2015)

- Ginni Rometti, CEO of IBM





SBLI

A case study on how SBLI leveraged technology to create a business ecosystem, reducing friction, increasing collaboration, and enhancing the customer experience.

In 1907, during one of the worst stock market crashes in US history, Louis D. Brandeis (who later became a US Supreme Court Justice) founded SBLI with the simple idea to do what many thought was impossible, provide affordable, dependable life insurance to all families who needed it.

Since its founding, SBLI has thrived, expanding its geographical reach and product range while still remaining true to Justice Brandeis's original vision. SBLI is also committed to the communities it serves and supports hundreds of charitable causes across the country. Today SBLI has over \$125 Billion of life insurance in force.

The Ecosystems Challenge:

Financial services, and the life insurance industry in particular, is comprised of an incredibly fragmented set of partners, an abundance of policies and procedures, regulatory compliance, complex processes with myriad touch points, and complicated personalized products which require detailed and responsive communication with customers.

Yet, the time and effort required to sell and service life insurance is key to keeping costs down and delivering affordable products. Since SBLI's mission is to provide affordable life insurance, it has to stay on the forefront of technology. But simply investing in numerous best of breed systems did not create an ecosystem. Instead it created a labor-intensive and time-consuming maze of partners, processes, systems, and people that needed to be coordinated in large part through manual intervention.

For example, industry solutions have many different marketing systems and partners that often produce duplicate instances of the same customer information, which lead to prospective customers being contacted by multiple parties, creating a less than optimal customer experience. This also meant that there were simply too many systems to access and too much time involved in getting the information needed to pre-screen applicants and determine what product options applied, and even more time to then quote rates and illustrate coverage.

In addition, life insurance applications are labor intensive and fraught with inefficiencies and delays spread across the entire ecosystem. This resulted in extensive email or phone communications, which eroded the customer experience and often resulted in a lack of response and in buyer's remorse—one of the greatest barriers to entry undermining their efforts to create value.

All of these fragmented processes and systems create an enormous burden of case management since companies like SBLI have to manually construct a case from its myriad sources of data in order to accurately respond to prospects and customers.

All of these challenges apply to every player in the insurance industry; however, SBLI took the lead in identifying ways to reduce the friction in its business processes since its mission is specifically to deliver the most affordable policies.

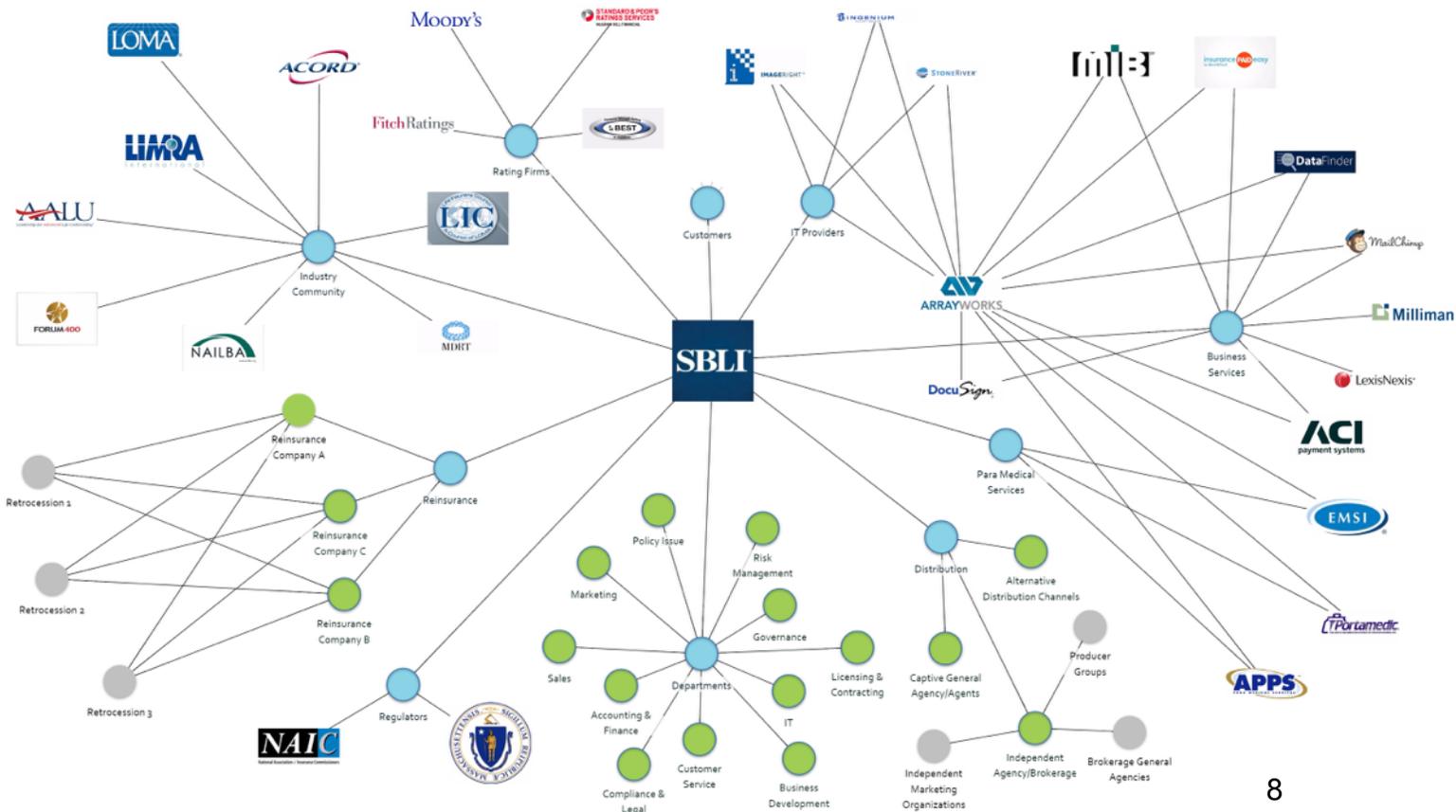
By using advanced ecosystem visualization tools and entity models that linked together disparate processes, tasks, and people, the SBLI solution empowered agents with one centralized access point, which coordinated all of the pieces and partners in the ecosystem.

The Ecosystems Solution:

SBLI used an ecosystems approach delivered by ArrayWorks to restructure its disconnected maze of systems. By using advanced ecosystem visualization tools and entity models that linked together disparate processes, tasks, and people, it empowered agents with one centralized access point, which coordinated all of the pieces and partners in the ecosystem. By presenting all of this in one seamless front end, SBLI created a complete on-demand view of the customer throughout the sale and servicing of a policy, thereby reducing response times and increasing the value of the overall customer

experience, as well as opening the door to ongoing innovation of new products and services. Unlike a simple portal, however, this view was dynamic and able to adapt instantly to changes, both on the back end when existing systems were modified or new systems added, and on the front end where sales required changes in how they accessed the various resources available to write a new policy. By using an ecosystem entity modeling approach, SBLI was able to connect every piece of the process and every source of data to every other piece. This provided near infinite flexibility in how the overall system delivered value in creating a trusted and complete view of the process, customer, and product, resulting in far more responsive customer experiences.

FIGURE 1



The Ecosystems Benefits

PROCESS
CONSISTENCY



SINGLE DATA
ENTRY



STRAIGHT THRU
PROCESSING



REDUCED
CYCLE TIME



SIMPLISTIC ONE-
STOP SHOPPING



SIGNIFICANTLY
REDUCED FRICTION
IN THE PROCESS



QUICKER TIME
TO MONEY



SMART DATA
CAPTURE



Key Opportunities and Imperatives of Digital Ecosystems

Whether your organization is a unicorn or an upstart, an Inc500 or a Fortune500, the greatest opportunity and the greatest threat will be how well you incorporate Digital Business Ecosystems into every facet of your business. Here are some of the key opportunities and implications of Digital Business Ecosystems.



1 Recognizing that few, if any, companies can “go it alone,” business leaders need to figure out how to orchestrate processes, capabilities, assets, products, and services dynamically across a wide range of organizations with shared interests. This creates the ability to innovate for new opportunities and threats as an ecosystem.

3 Digital Business Ecosystems create the opportunity to expand capabilities around your business core without owning them, as in the case of Uber.

5 Minimizing or removing existing friction (costs, inefficiency, latency, and poor resource utilization) will create new opportunities for businesses to not only streamline existing processes, but also free up resources for new innovation initiatives.

7 Governance will take on a new and expanded role in a Digital Business Ecosystem since the user-base, by definition, extends well beyond any single company, requiring strong profile-driven security and resource segmentation. For example, HIPPA requirements in the health industry and regulatory requirements, such as Sarbanes-Oxley, in financial services will need to be incorporated into the ecosystems model.

2 Digital Business Ecosystems create higher levels of collaboration, co-creation, and innovation. For example, in the SBLI case study, adopting an inclusive ecosystem strategy allowed SBLI to discover and create a direct connection between some of its major distributors, thus eliminating what had been weeks of friction in the application process.

4 Business process management (BPM) and Six Sigma will need to evolve to complement and support Digital Business Ecosystems by addressing cross-organizational processes, which are fluid and dynamically adaptive to new business opportunities and agile reconfiguration of the ecosystem.

6 An outside-in strategy, which supports collaborative business models involving complex networks of participants, will lead to a much more comprehensive view of the possible services and products that an ecosystem can deliver. For example, Amazon’s recent announcement to partner with Boeing to create an ecosystem model for package delivery illustrates how otherwise separate companies can collaborate to identify new areas to create value for customers.¹³

8 Rather than simply responding to change, ecosystem businesses will be built for change through the use of tools such as Enterprise Applications Platforms (discussed further in the next section), which support a degree of partnering complexity previously not possible.

In almost all of the above opportunities and imperatives one thing is common, the importance of adopting a new view of the organization as an expansive network of relationships and alliances that need to be understood and managed not from the inside out through ownership, but rather from the outside in as strategically aligned collaborators.

Working From The Outside In - Strategies For Leveraging Digital Business Ecosystems

Competitive advantage is now the result of an entirely different strategy that requires a new set of tools and approaches which look at a business process well outside of the four walls of any single organization.

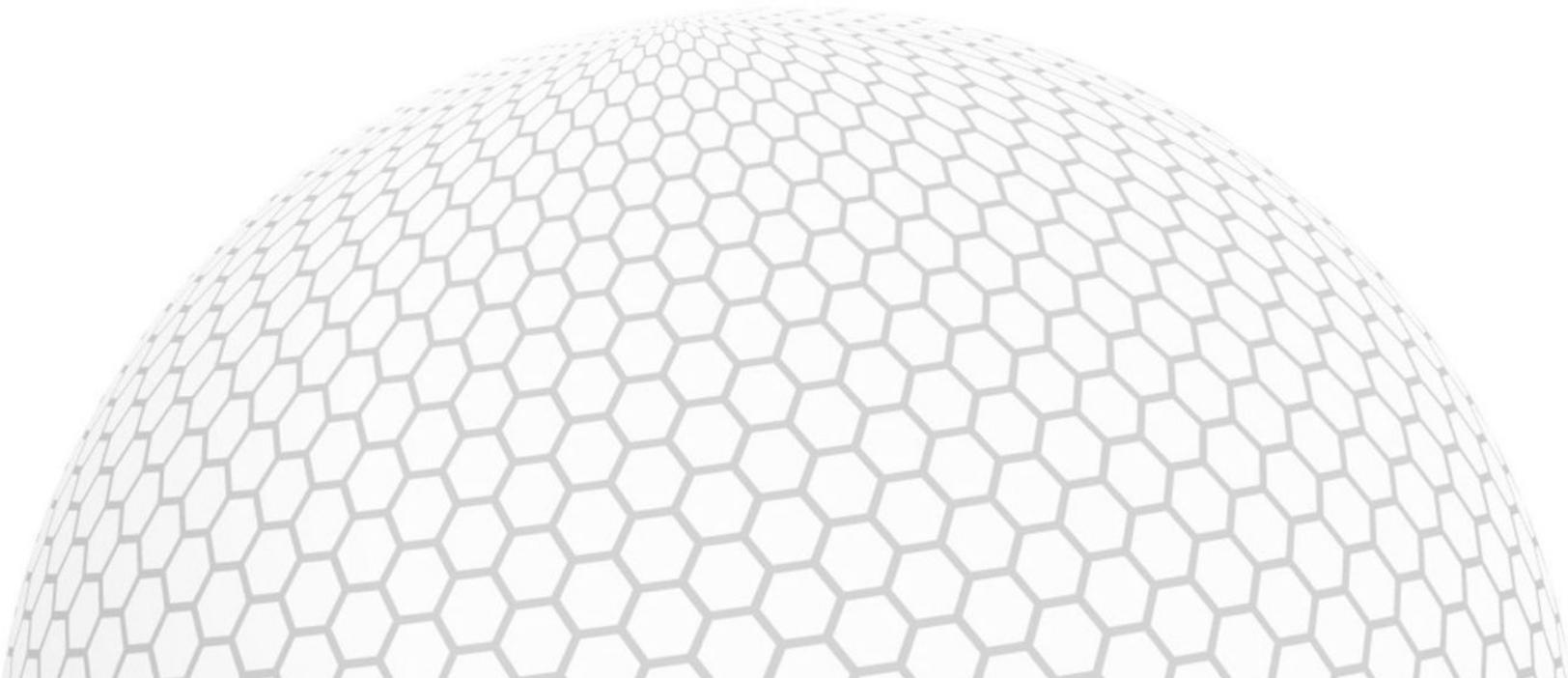
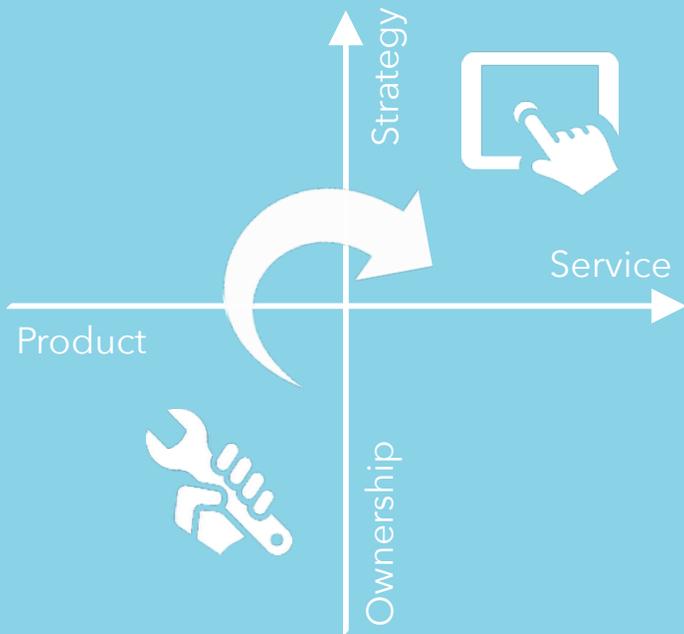


FIGURE 3

The Most Significant Shift in BPM



Throughout the last century there has been a slow but steady shift from the notion of standardized products and clearly delineated organizational boundaries (think of the Ford model where the product was “any color as long as it’s black” and where every supplier was owned or controlled by Ford) to networks held together mostly by strategic alignment where nearly every product is sold with a service or experience component.

Orchestrating these complex networks of partners, alliances, regulators, and customers is the fundamental shift from the industrial and information era models to the Digital Business Ecosystem model, in the upper right quadrant of this figure.

Rather than being focused on the inside-out processes and resources of any single organization, process management now needs to focus on the outside-in where resources are shared and distributed across an ecosystem.

Digital Business Ecosystems’ strategies reflect a significant shift from an inside-out perspective, to one that looks at the entire ecosystem from the outside-in. Pulling, digesting, and interpreting data from across the full breadth of the Digital Business Ecosystem and then acting on the trusted insights that this data provides is a critical part of this fundamental shift.

Although Digital Business Ecosystems reduce friction in a business process, among alliance partners, and within a marketplace, they are difficult to represent. In an ecosystem, the processes and systems used across a network of business partners creates a level of collaboration and innovation that is far more inclusive and responsive by leveraging the collective knowledge and resources of the ecosystem.

Traditional BPM works well in areas where a business has established, well-understood transactional processes, but they fall short when the rate of change and scope of a process encompasses many disparate parties. However, trying to confine a process to one organization, or using differing process automation tools across multiple organizations, is simply unsustainable. While driving friction out is often considered an internal exercise, the greatest friction and inefficiency is always between multiple organizations’ processes. Taking an outside-in view of the process, as an ecosystem and not as just a collection of organizations, dramatically decreases process friction.

If the ecosystem model is already changing your industry, as it will every industry, how will your business have to change to accommodate this new reality? The answer lies in the evolution of a new set of tools for enabling enterprise application platforms.

A NEW PLATFORM FOR BUILDING DIGITAL BUSINESS ECOSYSTEMS

Strategists and thought leaders alike characterize Digital Business Ecosystems as a revolutionary new era in business strategy, and pinpoint a new breed of Enterprise Application Platforms as the engines that are fueling amazing transformations.

While the concept of Enterprise Application Platforms (EAPs) is not entirely new, until recently they have largely been homegrown solutions intended to bring together a narrow subset of knowledge, people, and resources. These were not portable or scalable solutions; they only worked within very isolated situations.

Creating Digital Business Ecosystems demands an entirely new way of looking at and enabling fluid business interactions across a network of diverse participants. What are starting to evolve are highly configurable EAPs that dynamically link internal and external resources. They are built to manage a complex set of interrelated activities and people that constantly reconfigure themselves, in order to address the opportunity or challenge at hand in the most

expedient and effective way. Alliance partners are able to co-create new opportunities based on insights that could not have otherwise been known or leveraged.

To tap into these insights a new field of Data Science is expanding to create competitive advantage.¹⁴ Data Science is the study of patterns in data and behavior (of people, objects, and transactions) to identify new opportunities for creating value. For example, by studying consumer patterns of behavior, retailers such as Amazon can better target and predict customers' needs. In a Digital Business Ecosystem this takes on a much larger role of re-orchestrating a value chain to meet market needs and value chain capabilities. As described in the book *Cloud Surfing*,¹⁵ companies such as E2Open are doing this across vast ecosystems, such as the suppliers of parts for the Boeing 787 Superliner, to reconfigure the value chain in a way the best optimizes the potential partners and suppliers. This happens in an autonomic way so that the ecosystem responds to changes without manual intervention. The result is an intelligence that is now being built into the ecosystem and which responds immediately to markets.

This same phenomenon is also being seen in the automobile industry where players such as Covisint have built EAPs for enormous Digital Business Ecosystems that orchestrate thousands of suppliers, partners, and alliances across all of the major manufacturers.¹⁶

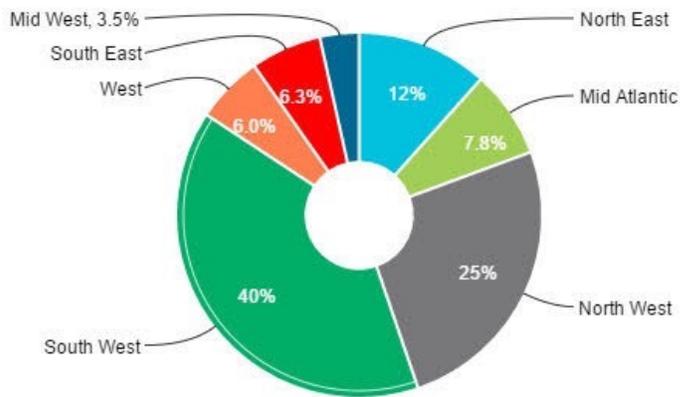
One of the most important, but also least expected, benefits of these vast ecosystems is that the relationships being managed and the data being collected about these relationships can be used to understand behavioral patterns between and among all of the resources and the transactions of which they are part. Data scientists call this sort of view of digital behavior a “longitudinal view” because it cuts across any number of selected resources, allowing you to mine the process. In health care the longitudinal view is radically altering the way research into diseases is being approached by identifying patterns in data that would otherwise be invisible to researchers who were focused on just a narrow slice of the health care system. For instance, when you combine the data that flows between health care providers, insurance payers, patient behaviors, and pharmaceuticals, you not only remove the friction in the health care system, but you also start to see new unanticipated relationships.

The problem has been that the patterns we know to look for are not the only patterns that lead to solutions and significant new value creation. This is why so much of invention and discovery has historically happened as the result of accidental or serendipitous occurrences. Being able to make this sort of discovery systemic amplifies your ability to innovate and create new value.

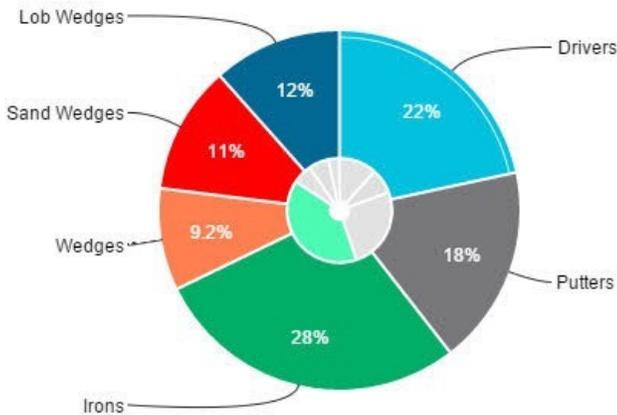
EAPs need to incorporate these new data science capabilities in order to provide immediate access to new trends and insights. A simple example of how this might work is shown in Figure 2.



Club Sales by Region



South West - Sales by Club Type



South West - Drivers - Most Commonly Purchased With Drivers

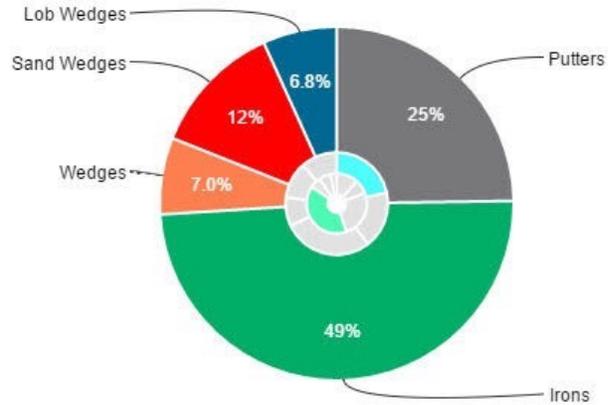


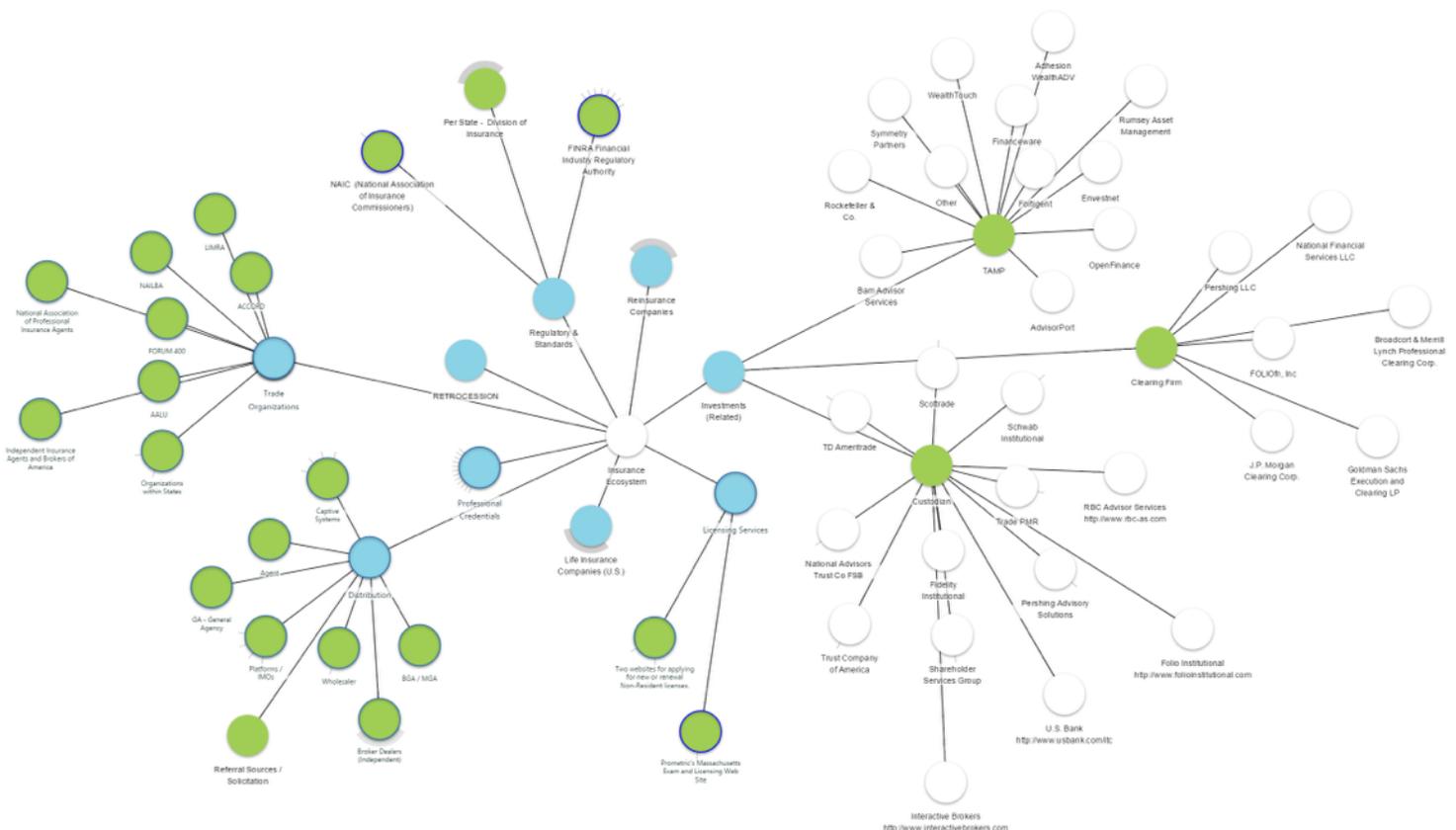
FIGURE 2 Data mining is a critical part of any Digital Business Ecosystem because it exposes trends and behaviors that can deliver key insights on how products and services are being used and indicators of new market needs. In this example, a unique visual representation of three pie charts is used to depict the buying patterns for golf clubs. In the top chart we see the distribution of golf club sales by geographic region. Exploding one wedge of this chart shows the sales in the Southwest region by club type, in the lower left pie chart. Drilling down even further, in the bottom right pie chart, we see the types of golf clubs most commonly purchased in the Southwest region along with a driver purchase. Data mining of this sort can lead to a better understanding of the demand in order to respond to market opportunities.

VISUALIZING ENTIRE ECOSYSTEMS

The complexity of a digital ecosystem requires a new way of looking at and navigating business processes, partnerships, alliances and customer relationships. Yet it's striking to consider that process flow diagrams (which are used to describe and navigate complex processes) haven't changed much in the past 100 years, dating back to 1921 when Frank Gilbreth first introduced them¹⁷ Because of the complexity of Digital Business Ecosystems, an advanced approach to visualization is also emerging that fits directly into the ecosystems view of process automation. We already looked at one example of this in the SBLI case study (Figure 1). However, there is another

way to visualize the relationships between various resources in a business ecosystem in real-time.

FIGURE 3 This eco-view of a Digital Business Ecosystem provides a complex description of the many relationships of a financial services firm. The expansiveness of this sort of network of relationships can be daunting at first glance. However, a new metaphor exists that allows you to fly through the network, drill down into its individual elements, and easily navigate all of the relationships depicted. This eco-view is not static. It is constantly changing and can be dynamically navigated in real time. Go to www.arrayworks.com/eco-view to see a short video example of how you can navigate even the most complex ecosystems with a simple touch screen interface.



This unique fly-through view of the organization's resources creates an ecosystems solution that is infinitely flexible and which allows you to better understand the complex and multifaceted relationships between resources. What's especially radical about this tool is the ability to build and view a process in this approach in real time based on the requirements of the scenario at hand.

EAPs will play a pivotal role in enabling Digital Business Ecosystems. However not all EAPs are created specifically to work in an ecosystems framework. The specific capabilities to look for are extensive, however, here is a quick look at some of the things to look for in an eco-friendly EAP:

- Solutions that are architected to offer rich representation of the elements of ecosystems and the co-evolving relationship between ecosystem participants,
- Visualization tools to dynamically view data and analyze relationships between elements,
- The ability to Animate and Reanimate how data moves/flows in and between participants,
- The ability to easily and in real-time Monitor and Modify processes,
- The Ability to Mobilize networks of collaboration.

By providing these tools, an EAP can support a Digital Business Ecosystem by making it easier to

visualize, orchestrate, leverage, and enable the complexity and the power of all the diverse resources included in the ecosystem.

CONCLUSION

As Digital Business Ecosystems evolve, the opportunities to create new business models, constructs, and new levels of innovation will accelerate rapidly—in fact, as we said at the beginning of this white paper, exponentially. The result will be an unprecedented rate of new value creation.

The ability to visualize business in real-time using a metaphor that more closely resembles the dynamic and adaptive nature of an ecosystem, the ability to change process models so that they are constantly synchronized with the entire network of participants who form the ecosystem, and the ability to analyze the vast data created by an ecosystem, in ways never contemplated by a business or technology architect, are all becoming competitive mandates. The net benefit of all of this change is simple but profound: a level of collaboration and orchestration that will make us cringe at how primitive business was before the advent of Digital Business Ecosystems.

Yet, as with most radical advancements, taking advantage of the change means not being held hostage by the past. Whether you adapt to the ecosystem model or not, it is already changing your industry as it will every industry. The good news is that you do not need to adopt a wait-and-see attitude towards Digital Business Ecosystems because the change has already begun.



This white paper was authored by Delphi Group, thought leaders in leading edge trends for business and technology for over 25 years.

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Contributions to this white paper from Arrayworks, Inc., a low-code Enterprise Application Development Platform

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