

## **Innovation Ecosystem Management Leadership in Project Management and Business<sup>1, 2</sup>**

**Darrel G. Hubbard, PE, President & CEO**  
D.G.Hubbard Enterprises, LLC

**Peter W. Rogers, CEO**  
P17 Group LLC and Senior Consultant  
The Experience Praxis Group, Inc.

### **INTRODUCTION**

Innovation, within business and project management, is strategically positioned ideas implemented to create business value and benefits for the enterprise. A significant difference exists between the concepts of innovation and creativity. Creativity, in a business context, is the ideation process of forming and relating ideas. But ideas are useless unless implemented. Therefore, it is not how many ideas a company has, but how many ideas are transformed into reality. That requires innovation, which is the process of turning an idea into a producible, marketable, and valuable form. Innovation in business and project management is about practical creativity, which is about making a new idea useful.

Why is innovation so important today in the management of businesses and the management of projects? Quite simply because innovation—incremental, disruptive, and transformational—fuels and sustains business growth. It is the force that assists an enterprise in adapting and staying alive. Transformational digital innovation has moved the world marketplace and industries out of the Third Industrial Revolution into the Fourth Industrial Revolution of digital disruption.

The Third Industrial Revolution, known as the Information Age, is considered the time-period from about 1970 to the year 2000. That era shepherded in the proliferation of computer-chips, the introduction of the personal computers, the beginnings of automation technologies, and the ability to technologically transfer information quickly. This revolutionized operations almost everywhere from manufacturing, to management, mass media, health, governmental institutions, and entertainment.

The Fourth Industrial Revolution, the era of Digital Transformation commonly called “Industry 4.0,” arrived with the advent of the 21st century. Klaus Schwab, in his 2016 book, *The Fourth Industrial Revolution*<sup>[40]</sup>, has opined that digitalization, emerging technologies, and broad-based-innovation will revolutionize everything. He noted that “major technological changes are on the brink of fueling momentous change throughout the world.”

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Industry 4.0 refers to the current trend of extensive automation and data exchange in manufacturing, production, and services. The oncoming Digital Transformation being driven by Industry 4.0 isn't something evolutionary: it's revolutionary. It includes a wide range of current and future business related functionality, such as: cyber-physical systems; Internet of Things; Internet of Robotic Things; Internet of Systems; Location of Things; cloud computing; cognitive technologies and computing; predictive analytics; device interoperability; information transparency; decentralized decision-making; artificial intelligence; consumer software applications; smart manufacturing; ubiquitous mobile supercomputing; intelligent robots; self-driving cars; neuro-technological brain enhancements; genetic editing; technological convergence; integration of operational technology with information technology; combining big data and materials science; bi-directional assistance between humans and machines; software-defined infrastructure; converged infrastructures; DevOps; and Blockchain.

By applying and embedding smart and connected technology, Industry 4.0 is transforming enterprises, economies, jobs, and even society. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, societal, and biological spheres. It is creating digital enterprises that are both interconnected and capable of more informed decision-making and that can communicate, analyze, and use data to drive intelligent actions within our physical world. Industry 4.0 is driving the integration of digital and physical technologies across all areas of business, society, production, mobility, and communications. It represents broad and pervasive industrial, business, and societal shifts that must be dealt with comprehensively, if enterprises are to survive as a minimum and hopefully thrive. All revolutions are disruptive. Industry 4.0 is no exception by portending tremendous opportunity for new products and services, better ways to serve customers, new types of jobs, and wholly new business models. It has the potential to fundamentally alter the way we live, work, and relate to one another. In its scale, scope, speed, and complexity, the transformations will be unlike anything humankind has experienced before.

Scope, systems impact, and velocity are three reasons why today's innovation driven transformations represent not merely a prolongation of the Third Industrial Revolution but rather the arrival of a distinct Fourth. The speed of current breakthroughs has no historical precedent. When compared with the three previous industrial revolutions, Industry 4.0 is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country. And the breadth and depth of these changes foreshadow the transformation of entire systems of production, management, governmental operations, enterprise governance, line-organizations, and whole enterprises. No public or private enterprise will be immune. Resistance is futile. Enterprises that ignore it will end up befuddled in bankruptcy court.

Major disruptions are happening in multiple industries, and no enterprise is too big to have the proverbial rug pulled out from under it. It used to be about the big eating the small; now the fast annihilate the slow. An IDC report "FutureScape: Worldwide CIO Agenda 2016 Predictions"<sup>[23]</sup>, emphasized that, "One-third of the top 20 firms in industry segments will be disrupted by new competitors within five years," and that it's a matter of "transform or perish." Innovation in the marketplace is fast and sustained. Today, companies such as Amazon, Apple, Google, Microsoft, Uber, Facebook, eBay, Tesla, Netflix, RedHat, Walmart, and Mayo Clinic are disrupting their markets with innovative approaches within their business arenas.

Today Pan American World Airways, Standard Oil, F.W. Woolworth, Kodak, and Circuit City are companies that exist only in people's memories. Changing consumer tastes, evolving

technology, corporate complacency, poor executive leadership, failure to innovate, and/or poor business decisions ended these iconic brands. Companies such as Blockbuster, Compaq Computers, Enron, MCI Worldcom, Tower Records, Polaroid, Eastern Airlines, DeLorean Motor Company, RadioShack, and Pets.com failed to innovate sufficiently or transform fast enough and have gone out of business.

Sears Holdings, American Apparel, Toys R Us, Teavana, Abercrombie & Fitch, Foot Locker, Best Buy, Sam's Club, J. Crew, Gap, and Banana Republic are in danger of going out of business. While, other companies like Aeropostale, Nine West, Payless ShoeSource, and The Limited are already in, or have gone through, Chapter 11 bankruptcy and are trying to transform.

Therefore, every enterprise, and department therein, including the project management discipline and wherever project management manifests itself within the enterprise, will benefit from leading a *managed innovation ecosystem*. An ecosystem wherein specific principles, practices, processes, and tools guide behaviors and decisions to create a mindset, toolset, and culture of innovation. An ecosystem that works harmoniously with organizational structure and in alignment with strategy, resulting in sustained enterprise-wide creativity and innovation. This innovative mindset and culture both require organizational agility. They must permeate and be integral with the enterprise's organizational structure and strategy, and not be sequestered within an innovation lab or silo. Organizational agility accelerates the innovation process and reduces the resistance factors and risks inherent in change and innovation. It engages, empowers, and enables the entire enterprise and its innovation ecosystem.

We live and work in a volatile, uncertain, complex, and ambiguous (VUCA) world. Organizations are facing heightened competition and ongoing disruption from exponential technological change, market shifts, and social change. Our ongoing research<sup>[1,2,3,4,5,6,7,21,22]</sup> demonstrates that innovation is inextricably interconnected with organizational culture, organizational structure, organizational agility, project management, operations management, change management, and strategy. All are necessary for enterprise growth and being competitive within today's business environment. Because these areas are so entangled, executive leaders seeking to enhance their enterprise's innovative capabilities must also address, in some form, the other areas.

In addition, the speed of change in business is also an issue in most enterprises, when considering that digital transformation is about so much more than technology. In the past, a steady cadence of continuous improvement was sufficient to maintain a company's market position. Today, incremental improvement, although still necessary, isn't sufficient to foster the performance that will get most businesses to where they can stay competitive. Therefore, a current major business driver for enterprises is innovation. This includes the ability to innovate on a broader-scope, because market dominance now depends on fast, more-complex, and transformational change. To address this need, an enterprise requires systematic and repeatable innovation processes and methods to foster and manage the speed and agility necessary to successfully manage innovation.

Project Management (PM) is gaining a prominent role in advancing innovation, because innovation initiatives result in projects that must be managed for the future success of the enterprise. The evolving digital environment is also constantly morphing, requiring all leaders to adapt. Improvements in technology and business software continue to minimize the effort needed for rote and mundane project management tasks. These changes are also driving the need for project managers and project management organizations to be increasingly innovative. In

continuing to successfully perform portfolio and program strategy execution, project management leaders must re-evaluate and re-invent their discipline, systems, processes, metrics, and tools—failure to transform will be fatal to the PMO and their positions. This means the business-role of Project Management (PM) will continue to change as the marketplace changes.

The Project Management discipline specifically involves the project aspects, versus the operations aspects, within the larger field of Business Management. Also, when the implementation of project management moves above and beyond the technical perspectives of managing the traditional work elements of scope, schedule, cost, etc. on single projects, it moves into the business arenas of managing project-programs and project-portfolios. These are two reasons why we use the term Project Business Management (PBM). A third is to signal the inclusion of those business aspects in more accurately communicating with executives and managers who have not had direct management experience or training in the business aspects of the project management discipline. We also use the term Organizational Project Business Management (OPBM) when working with executives so they understand the business need for installing project management, in addition to operations management, at the enterprise-level within their businesses.

OPBM and its associated implementing Project Management Organization (PMO) function must be made a part of the enterprise's innovation ecosystem. Why? Because the operations of each PMO are heavily influenced by the company's innovation ecosystem, and each PMO has its own innovation ecosystem and can itself influence the company's innovation ecosystem. Therefore, PMOs and PMO personnel need to become more flexible, adaptable, and agile, and must focus on delivering business value, while maintaining their ability to perform the traditional PM work elements. PMOs can also be the vanguard for advancing innovation as a business process on an enterprise-wide basis.

Scores of companies are betting on emerging technologies to create their next big thing or maintain their market position. The advent of the Internet of Things and the oncoming impact of Artificial Intelligence begin to reveal what types of disruptive innovation are likely to happen. The pace of change is moving quickly and those enterprises and their PMOs that don't innovate, and drive disruption, will be left behind. As with any change, even the disruptive kind, there comes tremendous opportunity to create value, but only if leaders, managers, employees, and their enterprises and PMOs possess the right growth and innovation mindsets.

The password to this transformational era is innovation, and the primary key to unlocking that future in business is an innovation ecosystem. Transformative innovation is a strategic initiative. If that strategy can be executed as part of an enterprise's current operations, then that strategy is not significant or far-reaching enough to be an adequate response to Industry 4.0. Gartner predicts that, by 2021, enterprises who commit dedicated organizational resources to ensuring their strategies are successfully executed will be 80 percent more likely to be industry leaders<sup>[34]</sup>.

Focusing on disruptive innovation will lay the groundwork for creating the kind of disruptive ideas that lead to new business models, products, and services. Today, all markets are susceptible to disruption. Right now, a couple of college students in a garage or dormitory somewhere, or millennials in a company skunkworks, may be working on ways to put your business out of business—not by taking your customers, but by changing the way your market functions.

## **INNOVATION ECOSYSTEM MANAGEMENT CONCEPTS, PRINCIPLES, AND PRACTICES**

The collision of technological disruption, rapid emerging-markets growth, and widespread demographic shifts is upending long-held business and market assumptions that underpin strategy setting, decision making, and management (McKinsey Quarterly - September 2014). Demographics have already changed world-wide. Today, in America, millennials have surpassed baby-boomers as the largest generation, while older people are now working longer. The world-marketplace has entered the knee-bend of the up-sloping exponential curve for technological advances and the burgeoning application of new technologies to yet unthought of areas. Innovation awaits!

The changing nature of the business world is resulting in increased pressure on enterprises to continuously innovate and experiment with:

- Trying new products and services;
- Improving the customer’s experience—how customers feel when they interact with a company and its offerings; and
- Transitioning offerings to market.

Innovation is the origination of an idea in the mind of an employee. In practical terms, this means both conceiving and possibly inventing something in their own mind. That creation could be a new or modified device, product, service process, system, software application, organizational structure, culture, marketing strategy, manufacturing technique, and more. These innovations are the life-blood of a company and result from people’s daydreams, insights, intuition, research, study, experimentation, collaboration with others, etc.

Through our research and in speaking with executives from many industries, company sizes, and states of operational and project management maturity, a recurring pattern revealed itself. All enterprise executives and PMO executives face the following challenges within their marketplaces, with respect to innovation:

- Accelerating their pace of innovation;
- Shaping and shifting organizational culture and structures to support innovation, drive performance, and produce value;
- Developing the appropriate Growth and Innovation Mindsets;
- Developing and maintaining organizational agility and organizational adaptability in support of innovation;
- Possessing and using processes and tools specifically designed and developed to support innovation and the resulting changes created; and
- Producing innovative products and services to create benefits and value for the enterprise

Peter Drucker said in 1985, “The temptation in the existing business is always to feed yesterday and to starve tomorrow. It is, of course, a deadly temptation. The enterprise that does not innovate inevitably ages and declines. And in any period of rapid change, such as the present, an entrepreneur period, the decline will be fast<sup>[10]</sup>.” Complacency and playing-it-safe, an aversion

to risk, will be the death of a business. Companies must be proactive—not complacent. To be successful, leadership must actively manage innovation and company culture. Organizations that do not manage culture will struggle to effectively innovate. Organizations failing to manage innovation will recede and die.

Today this is more relevant than ever. Executives point to a surplus of ideas and a lack of execution, which is not turning those ideas into reality. From a project management perspective, many organizations today report a high demand for project execution and not enough capacity to do them. Enterprises risk falling behind their competitors, without having a dynamic project-management-based strategy-execution delivery capability and a laser-like focus identifying the most valuable and innovative developments.

Although 84% of executives agree that innovation is critical to their business, 94% were not happy with their innovation performance<sup>[26]</sup>. We find that few companies have a disciplined and repeatable approach to innovation.

Within business, the management of an enterprise's innovation processes and change management processes need to be integrated. The management of innovation must allow the enterprise to respond to both external and internal opportunities. This process needs to generate something that can be introduced into and adapted for the enterprise or launched into the marketplace ahead of the business competition. Seventy-nine percent (79%) of the most innovative companies have well-defined innovation strategies, as compared with 47% of the least innovative companies<sup>[36]</sup>.

Innovation is a driver of rapid growth and profitable revenue growth and is an integral process for long-term business success<sup>[36]</sup>. Therefore, an enterprise's leadership effectiveness, the overall leadership styles within the organization, the enterprise's business culture and structure, and the company's profitability are closely related to management's and leadership's ability to lead and manage innovation.

Further, we find that most companies think that innovation is mainly for research and product development. Innovation needs to occur everywhere throughout the enterprise and involve personnel at every organizational level in contributing creatively to move the enterprise ahead of its competition. Companies need a culture of innovation and associated risk taking that supports performance and marketplace dominance.

The most innovative and agile companies do not predict the future; they make it. They generate a brand-new market by simply creating and offering something that people did not consciously know that they needed or wanted.

Therefore, every enterprise needs an *innovation ecosystem*, which is the environment required by the enterprise within which creativity and innovation can thrive. That ecosystem is composed of principles and practices, and related specific tools and processes interacting inside the environment of the organizational culture and structure. Those specific principles and practices must foster a creative mindset for innovation, within both the operations management and project management disciplines.

### **Primary Innovation Principles and Practices**

An innovation ecosystem includes a social environment, which is the organization's culture, and a physical environment, which is the organization's structure. The following are the twelve primary principles and practices of an innovation ecosystem.

- 1) *Multi-Level Responsibility for Innovation and Skilled Talent*: Everyone within an enterprise is responsible for being innovative. Enterprises and organizations are not sentient, they do not innovate. It is the feeling and consciously perceiving personnel within them that innovate. People, not technology, are the most important piece in today's digital transformation maze. An example is Tesla's business problem with its extensive use of production-line robotics to assemble its Model 3 cars, which has led to more complexity and resulting delays. Elon Musk, its CEO, acknowledged this in an April 2018 tweet: "Excessive automation at Tesla was a mistake. To be precise, my mistake. Humans are underrated."

As the pace of technological change quickens, enterprise's need to be sure that personnel are keeping up with the right skills, and this applies to both technical and soft skills. However, the enterprise's business units, including the PMO, are responsible for managing innovation using appropriately developed talent, goals, and metrics. For success, it's critical to measure and inspect what is expected.

- 2) *Managed Change*: Leadership must establish the formal means to make the necessary strategic changes in culture, structure, and processes. This is needed to overcome identifiable business challenges to managing innovation in a nimble and flexible manner. This requires focusing on making the enterprise more innovative, growth oriented, competitive, and profitable. Enterprises need to inculcate a change mindset across the organization, and to take both small and large steps to accomplish that. The ultimate challenge in change management is now digital transformation. Why? Because it impacts all levels of an enterprise, its structure, and its extended supply chain, as well as industry and strategic positioning.

Executives must constantly challenge their organizations to ensure technology-enabled changes can unlock productivity gains and provide significant competitive advantages. The old business cultural mindsets of, "if it's not broken, don't fix (change) it," or just incrementally change it, do not apply in this new digital transformation era. Incremental innovation tends only to delay the demise of the enterprise.

- 3) *Innovation-Mindset*: Innovation is the single most important factor in the future growth of any current or proposed business venture. Innovation is a mindset. It is a way to think about the enterprise's business strategies, practices, and talent that can lead to future growth. This is the concept of an individual's or an organization's tendency toward innovativeness, or in business the propensity to produce new value.

All people and companies are capable of being innovative, but some are more predisposed to value creation than others. Developing an innovative mindset to create and capture new value will vary from enterprise to enterprise, and individual to individual. In practice, there are no generic answers. For the enterprise to have an enduring capacity to innovate, innovation must function as both an individual and organizational behavior that leadership perpetuates, rather than simply a corporate-defined strategic initiative. The primary source of the power to innovate, in any enterprise, exists in the minds of its leadership and employees. For an Innovation-Mindset to flourish the organization must:

- Understand that innovation is as much about attitude and perspective as it is about process, because perception separates the innovator from the imitator;
  - Create an environment in which employees can focus on outcomes instead of getting caught in an activity trap. Make time in employees' daily schedules for creativity and innovation, because employees aren't going to innovate when they are stretched too thin;
  - Embrace challenges, setbacks, and obstacles with creativity and imagination;
  - Invite constructive feedback from employees;
  - Assist employees in mastering new skills, acquiring new capabilities, accessing additional information, and committing to continuous learning and experimentation;
  - Create an environment where resourcefulness is encouraged and rewarded;
  - Encourage employee physical activity, because people are most innovative when they are up, moving about, and being active;
  - Have leadership walk the talk of innovation;
  - Encourage innovation and expect failures and the resulting learning. Because, even with a focused innovation ecosystem, the ideas generated and the related innovations proposed aren't all going to be winners. Innovation requires experimentation; and
  - Make decisions without all the answers.
- 4) *Growth-Mindset is a prerequisite for an Innovation-Mindset*: An organizational Growth-Mindset, as a part of the organizational culture, is requisite for developing an organizational Innovation-Mindset. Employees in a "growth mindset" company are<sup>[16]</sup>:
- ✓ 49% likelier to say that the company fosters innovation,
  - ✓ 65% likelier to say that the company supports risk taking,
  - ✓ 47% likelier to say that their colleagues are trustworthy, and
  - ✓ 34% likelier to feel a strong sense of ownership and commitment to the company.

Carol Dweck, in her book *Mindset*<sup>[12]</sup>, refers to people and organizations with a "growth mindset" as those who enjoy challenges, strive to learn, take risks, and consistently see potential to develop new capabilities, products, and services.

When it comes to innovation, conversely, a fixed mindset can be a creativity killer. Dweck views individuals and organizations with a predominately "fixed mindset" as: perceiving talent as a quality people either possess or lack; eschewing failing; having employees who are less committed; and viewing services and products to be as good as they can become<sup>[12]</sup>. Enterprises with a fixed-mindset are basically risk-averse, have significant resistance-to-change, and lack a fundamental internal capacity for innovation.

- 5) *Culture of Innovation and a Supporting Organizational Structure*: An innovative mindset and culture must permeate the enterprise. Because, the effective management of innovation is directly related to a company's organizational structure and its associated culture and only partially related to resource management. A culture of innovation is an environment of collaboration that promotes communication, learning, maximum contribution, risk-taking, and creativity. This means the overall culture and related structures need to be transformed to promote a growth-mindset and an innovation-mindset, and to advance the associated understanding of innovation management within internal operating organizations.
- 6) *Disciplined and Repeatable Innovation Process and Supporting Tools*: An innovation process that is disciplined and repeatable must be developed and employed. Leadership must identify the specific capabilities that must either exist, or need to be acquired, to support the management of innovation. Management must define the related business factors that must be developed, cultivated, ameliorated, or addressed. This requires identifying and then creating or acquiring the necessary tools and missing assets followed by their implementation.
- 7) *Innovation Planning*: Strategic innovation planning is a business management planning process that prioritizes and converts the innovative ideas of the enterprise into business plans and then transforms those innovations into strategic initiatives. All strategic innovation initiatives result in projects, project-programs, and project-portfolios that must be managed and executed to accomplish those strategic innovations<sup>[1,2,5,6,17]</sup>. Within business, strategic innovation initiatives need to be stated as an endeavor intended to achieve three interrelated outcomes:
- Setting a boundary-spanning strategic intent that is near-term in its vision;
  - Defining the enterprise's intended achievements from an innovation in terms of business results, benefits, and value interpreted from various perspectives—such as: financial, infrastructure, customer, products, software, services; and market-dominance; and
  - Establishing specific required organizational cultural changes, structural changes, and outcomes that are achievable and measurable with respect to innovation.
- 8) *Innovation Budgeting*: Innovation management needs to be performed within the context of a leadership established budget that is specifically for innovation and a governance model process with associated metered funding and approval gates.
- 9) *Managed and Supported Calculated Risk Taking*: Risk taking requires a culture in which employees are provided with incentives and encouragement to work on new ideas and to innovate, despite uncertain outcomes or initial failures. The most effective leaders strive to systematically minimize the downside risk of their innovation upside-bets. When risk aversion holds sway, underinvestment in strategic opportunities and sluggish responses to quick-changing customer needs and market dynamics can be the result<sup>[27]</sup>. “Managed and supported risk taking can improve employee performance by a striking 39 percent<sup>[9]</sup>.”

10) *Open Internal Communications Flow*: A culture of internal communication is required for innovation to flourish. It is characterized by frequent and effective communication between peers and a steady flow of information. The flow is not only up and down, but enterprise-wide, including cross-discipline and cross-functional communication and interaction. Such a culture often has opportunities for junior staff to speak and interact with senior executives.

Creating open communication pathways for innovation helps lower-level employees send their best ideas up the management hierarchy for review. Ideas presented must be addressed by leadership one way or another, otherwise employees will become discouraged. Innovation is a team game. “A culture supporting internal communication has a significant impact on both innovation and on performance, leading to potential individual performance improvements of nearly 35 percent<sup>[9]</sup>.”

11) *Organizational Agility, Flexibility, and Adaptability*: Agile management practices support being safely disruptive in the discovery and design phases of innovation, which generate new developments and innovative breakthroughs from emerging trends. Organizational agility can be viewed as the ability to quickly reconfigure strategy, structure, processes, talent, and technology toward value-creating and value-protecting opportunities<sup>[28]</sup>.

An important aspect of organizational and human agility is the ability to make intentional shifts within the operations management and project management functions. This is necessary to be effective and efficient in the changing contexts being created by transformational innovations. An organizational shift to agility is the intentional development of competence, capacity, and confidence to learn, adapt, and innovate in changing contexts for sustainable and executable success<sup>[30]</sup>. An enterprise needs to continually adapt to change and be committed to process improvement for innovation management to be effective, which can lead to improving individual performance by 22.9 percent<sup>[9]</sup>.

12) *Leadership and Grit*: Angela Duckworth states in her researched work, *Grit: The Power of Passion and Perseverance*<sup>[11]</sup>, that a primary key for an individual to accomplish anything is that the person has the grit to accomplish their established goal. For an enterprise to achieve its strategic innovation initiatives, leader and line managers must both display and have the passion, fortitude, determination, and perseverance to accomplish those innovation initiatives.

Leadership must consistently walk the talk for an innovation ecosystem to function. Leaders need to comprehend where and how the fundamentals of their current operations could be unsettled by agile new competitive innovative market-entrants or new business models.

### **Innovation Management Framework**

Organizational operations business management and organizational project business management (OPBM) both require a management framework. Each one has different structures, processes, tools, and skills to support them. In addition, both require a culture of mutually working together and both can employ a common innovation management framework.

The combination of innovation principles and practices given above can be employed to create an innovation management framework solution, which can work for the business and set the company apart in its competitive arena. An example is the “I<sup>4</sup> Framework” and its associated processes and toolkit by Experience Praxis, Inc. which is a formalized disciplined and repeatable approach to innovation.

Three basic business questions need to be answered when establishing an innovation management framework:

- 1) How much market share and income are not being captured because the company is not being competitive in its marketplace?
- 2) What changes are needed to develop innovation processes and tools to create alignment of innovation management and culture with the enterprise’s strategy for innovation? and,
- 3) If the enterprise is competitive and profitable now, what changes related to innovation management principles and practices will increase profitability and maintain or improve market share or dominance?

The establishment, development, and implementation of an innovation management framework require actions, such as the following:

- Examine what innovation currently means within the enterprise. (Is it ideation without idea realization, or not aligned with strategy?);
- Assess where and how innovation happens throughout the enterprise. (Is innovation effective?);
- Determine the pace of innovation. (Is it high enough to maintain market position, or to gain market share?);
- Establish how to create innovation and growth mindsets and associated behaviors;
- Determine how either the innovation process might shape the business strategy, or the business strategy might shape the innovation process;
- Determine how to effectively blend and control the organizational politics and management egos in play that hamper innovation;
- Assure that innovation can and will happen in systems, processes, tools, organizational alignment, etc. and not just in products and services;
- Apply the innovation process to the organizational objectives, strategies, and structures;
- Manage the cultural changes needed to support innovation so people’s behavior can change along with the innovation processes, and tools implementation;
- Assure the culture provides the context in which to innovate;
- Assure executive management works on reducing cultural barriers to innovation;
- Engage, motivate, and focus the workforce on priorities that lead to innovation;

- Capture the energy of the chaos generated during innovation and channel it into constructive collaborative execution and value realization;
- Establish a culture of innovation to maximize the diversity and connectivity among personnel and teams and make innovation part of everyone's job;
- Define the kind of innovation required to drive growth and help meet strategic objectives;
- Add innovation to the formal agenda at leadership meetings;
- Set performance metrics and targets for innovation for operational functions;
- Design innovation communications connections and networks within the organization;
- Define and create the kind of culture needed for successful and sustained innovation;
- Have members of the executive team promote innovation as a core part of the company's strategy, then role-model the change, and engage middle management;
- Identify and select managers with growth and innovation mindsets to be innovation leaders;
- Create opportunities for managed disciplined experimentation, controlled failure, and quick success;
- Create separate planning processes for innovation efforts that are big enough to require dedicated teams;
- Talk to people within industries that are external to that of the enterprise, to bring ideas in from the outside;
- Speak with research institutions to infuse external knowledge and deepen the understanding of what may be possible;
- Address and continuously resolve the enterprise's innovation challenges one by one; and
- Establish a disciplined and repeatable process for innovation.

Business process and digital transformations within an enterprise require innovation across the company. Innovatively and effectively producing business results and value necessitates establishing an innovation ecosystem. Many enterprises have pieces of an innovation ecosystem framework today; but, few have all the pieces, and few are doing it well.

The mindset of personnel and the organizational culture are important for innovation to thrive, and an appropriate mindset and culture must be integral with, and reflected within, the enterprise's organizational structures.

## **ORGANIZATIONAL CULTURE and STRUCTURAL DESIGN PROMOTE INNOVATION**

While many companies are striving to become agile, only four percent of survey respondents have completed an organization-wide transformation, the latest McKinsey research finds, and the number-one problem they cite is culture: "Culture Can Make or Break Agility<sup>[29]</sup>." Also,

Satya Nadella, Microsoft CEO, said “Culture eats strategy for breakfast.” Since both statements are dependent on strategy and agility, by extending those thoughts we can say that culture eats innovation for breakfast and that culture eats market-position for breakfast.

A central finding from McKinsey’s recent survey of global executives<sup>[27]</sup> highlighted three digital-culture deficiencies: functional and departmental silos; a fear of taking risks; and difficulty forming and acting on a single view of the customer. In a digital world, solving these cultural problems is no longer optional. Executives must be proactive in shaping and measuring culture, approaching it with the same rigor and discipline with which they tackle operational transformations. This includes changing those structural and tactical elements in an enterprise that run counter to the culture change they are trying to achieve<sup>[27]</sup>. Shortcomings in organizational culture are key barriers to company success in Industry 4.0.

Organizational culture is generally viewed as encompassing those values and behaviors that contribute to the unique social and psychological environments of an organization. It affects the enterprise’s productivity and performance. Organizational culture is unique for every organization and one of the hardest things to change<sup>[24]</sup>. Often called corporate culture, it manifests itself in four ways:

- 1) How an organization conducts its business, including how it treats its personnel, customers, contractors, suppliers, and the wider community;
- 2) The extent to which personnel are involved in decision making and developing new ideas, and have freedom in personal expression;
- 3) How power, communications, and information flow throughout the hierarchy of the organizational structure; and
- 4) How committed personnel are towards the enterprise’s strategic objectives and innovation processes.

Andrew Pettigrew is widely credited with introducing the concept of “organizational culture” to the field of business with his 1979 article “On Studying Organizational Cultures.” Pettigrew offered insights on concepts and processes associated with organizational culture, which he equated with the birth of organizations. He described organizational culture as an amalgam composed of beliefs, identity, ritual, and myth—a conceptualization we still use today<sup>[35]</sup>. More specifically, according to David Needle<sup>[32]</sup>, organizational culture represents the collective values, beliefs and principles of organizational members. Organizational culture includes the enterprise’s vision, values, norms, systems, processes, symbols, language, assumptions, environment, location, beliefs, and habits. It is a product of multiple factors such as: history, product, market, technology, strategy, employee types, employee religions, management style, and national culture.

A 2003 Harvard Business School<sup>[15]</sup> study examined the management practices at 160 organizations over ten years and found that culture has a significant effect on an organization’s long-term economic performance. Culture can either enhance or prove detrimental to performance. The study reported that organizations with strong performance-oriented cultures witnessed far better financial growth. Without exception, those companies that outperformed their industry peers also excelled at four primary management practices—strategy, culture, structure, and execution. These are the same four primary practices cited by Thomas Peters and Robert Waterman<sup>[33]</sup> in 1982 as representing the fundamentals of business.

The Harvard study<sup>[15]</sup> also noted that those same outperforming companies supplemented their great skill in those four primary areas with a mastery of any two out of five secondary management practices—innovation, talent, leadership, mergers, and partnerships. This correlates with the Peters and Waterman<sup>[33]</sup> earlier findings that innovativeness, productivity through people, and the other cultural factors also have positive economic consequences to an enterprise's operations.

Additionally, a 2002 Corporate Leadership Council<sup>[9]</sup> study found that the four cultural traits of risk taking, innovation, flexibility (agility), and internal communications are important drivers of business performance. They also affect individual performance, including both direct and indirect effects. The combination of these four cultural based traits can be viewed as providing an emerging definition for a high-performance culture. That is a culture which creates a community of openness where employees are encouraged to experiment and try new things without fear of reprisal for mistakes.

Establishing an innovation ecosystem requires organizational culture and organizational structural design changes to foster innovation across multiple organizational functions. Companies need an organizational strategy, culture, and structural design that promotes innovation and can affect business strategy realization throughout both operations management and project management.

An enterprise needs to go beyond talking about innovation and looking at changing its organizational culture and related structures. It must act to address the ever-increasing velocity of marketplace change and the pressing demand to achieve both expected and required results. Enterprises have long declared their intention to get closer to their customers and today's era of digital transformation is forcing them to do that, while also providing the means. A customer-centric market focused organizational culture has become a matter of survival and that requires continuous enterprise-wide innovation.

An organization's culture affects the way the company's personnel and the functional organizations within the enterprise interact and cooperate with each other, stakeholders, and internal and external clients. Although a smaller company may have its own unique culture, a larger enterprise may have differing cultures throughout the company as well as co-existing subcultures. These differing cultures and subcultures may conflict with each other and the broader culture of the enterprise. The primary reason is that each subculture is linked to a different management team and is associated with a specific functional organization, which may be a stove-piped business unit within the enterprise<sup>[18]</sup>.

Examples are major enterprises, providing contracted technical services within the commercial and governmental sectors. Most of those firms are working internally to develop innovative products and services to maintain their market position. In addition, they are acquiring and merging smaller innovation-driven firms that are outpacing them. Those smaller firms have already developed and sold innovation-based products and services into the larger firm's market place. However, for the benefits and value of merging those acquisitions to be accretive, the major firm needs to already have a leadership-led company-level culture of innovation, organizational integration, and a flourishing innovation ecosystem. Otherwise, the acquired talent and the associated innovation and growth mindsets they purchased will wither and perish—as will the acquired market share.

The process of innovation cannot be sequestered within its own innovation-lab or organizational silos. Rather, an appropriate enterprise-wide organizational mindset and integrated culture are

essential for innovation to thrive. That innovation culture and related mindset must permeate and be integral with the enterprise's organizational culture, structure, and strategy.

In addition, the PMI Pulse of the Profession 2018 Report notes that four in five respondents say that soft skills, including communications and negotiation, are culturally more important today than they were just five years ago<sup>[39]</sup>. Two specific culture related soft-skill factors affect an enterprise's ability to maintain the dominant position it has achieved in its marketplace through innovation. They are related to how the enterprise's leadership interacts with and comes to be viewed by the media, marketplace, regulators, employees, contractors, and customers. Those two skill sets for leadership and middle management that have gained prominence and import in today's world-wide marketplace are the:

- *Cultural Intelligence of Management*: Leadership's ability and capacity in business to relate, adapt, and work effectively in an organizationally complex and multi-cultural business environment. It fosters tolerance and enhances positive cross-cultural interactions; and
- *Social Intelligence of Management*: Leadership's competence in business to facilitate interaction and communication with people and communities, both internal and external, where social rules and relations are created, communicated, established, and changed in verbal and nonverbal ways. It includes leadership's ability to:
  - 1) Perceive the multitude of elements in the internal and external business environments;
  - 2) Comprehend various societal situations, norms, and regulations;
  - 3) Project those understandings onto the current and future status of the company; and
  - 4) Act with integrity in the best interests of the company and its personnel.

Uber is an example of the potential negative impact that these two factors can have on a major enterprise. The company's innovative ideas and disruptive ride-sharing applications are celebrated for changing the business model for ride-hailing services. Uber's senior leadership displayed and allowed a sexist attitude, a hostile work environment, lack of respect for its contractor-drivers, and a culture of deceit. Examples of a deceitful culture at Uber, include:

- Deployed a software application named Greyball to evade local government regulators, which made it difficult for law enforcement officials to book rides, to take actions against Uber drivers, and to catch Uber operating where and when it wasn't supposed to;
- Surreptitious tracking of iPhones in violation of Apple's terms of service;
- Not running proper background checks on drivers to protect the public; and
- Uber actually understanding it is a transportation company, but declaring itself a technology platform—an attempt at regulatory arbitrage.

Uber's internal negative cultural and social norms supported by its leadership have caused issues with Uber's public image, its interfaces with its contract-drivers, and with local and state governmental organizations. Those leadership issues, which have been slow to be addressed, have hampered Uber from gaining market dominance and allowed the Lift startup ride-hailing

service to quickly gain significant market share. And, may allow Waymo, a Google spinoff, to be the ultimate winner in the coming autonomous-driven ride-hailing service business.

Facebook is another example. Its business model, of doing targeted advertising by data-mining of collected user demographic information from Facebook's user accounts, failed to adequately protect user's private information from exploitation by others such as Cambridge Analytica. The issue is that Facebook's innovative internet-based application used to create its profitable social-networking business is partially exposing the private information of 2.2 billion people worldwide. The CEO, Mark Zuckerberg, who has ultimate control over how Facebook functions, is grappling with this very public issue. Zuckerberg in US Senate testimony in April 2018 said, "We didn't take a broad enough view of our responsibility, and that was a big mistake. It was my mistake, and I'm sorry. I started Facebook, I run it, and I'm responsible for what happens here." Critics have long been demanding a privacy-policy overhaul, but Zuckerberg has been giving lip service to making the required changes. Zuckerberg said his personal goal is to fix the platform that he designed to build social community, but that is now increasingly blamed by the public for actually warping it. Throughout the continuing crisis, Zuckerberg has pitched transparency, but flinched at answering questions and personally craves privacy. Zuckerberg advocates for transparency and the interests of the community but his individual interests and private dealings don't always align with his public advocacy. This unresolved contradiction at the CEO leadership level and the resulting reactions have alienated users, drawn the ire of legislators, and damaged the company's image and business value.

When an enterprise's culture and structure demonstrate superior capabilities and execution effectiveness in innovation, it is outcompeting in its marketplace.

### **Organizational Project Management and the PMO**

One structural change that supports the management of innovation is implementing Organizational Project Business Management (OPBM) as an integral part of the enterprise's operations<sup>[6,7,21]</sup>. Our research shows OPBM organizationally facilitates the business-based selection and prioritization of innovative ideas. Its function is to execute innovative projects to effectively, efficiently, and agilely accomplish the enterprise's strategic innovation initiatives—and support establishing a sustainable competitive business posture and innovative organizational culture.

The concept of Organizational Project Business Management is based upon the idea that a correlation exists between the enterprise's capabilities in project management, project-program management, and project-portfolio management, and the enterprise's effectiveness in innovation management. OPBM, therefore, drives obtaining value and benefits from the innovation related work performed and resources expended<sup>[21]</sup>.

Most organizations in our research have some sort of entity typically called a Project Management Office, or more accurately a Project Management Organization (PMO)<sup>[5,7,20]</sup>. According to Gartner, by 2017 senior executives in most of the largest companies in America will rely on the larger enterprise-level project management offices (EPMOs) to implement company-wide strategies<sup>14]</sup>. The EPMO is the function within the enterprise that institutes and manages Organizational Project Business Management for the execution of project-portfolios, project-programs, and projects. Our research shows that the PMO can be the executive-level business function accountable for enterprise-wide development, distribution, and management of Project Management discipline best practices<sup>[17]</sup>, including innovation management.

Gartner has stated that the stakes of digital transformation are particularly high for project management offices (PMO), PMO leaders, and project management practitioners. They must reinvent their profession and earn executive leadership interest in providing them with engagement and funding for this new future. To do this they need to adapt, seek new and unexpected partners, and become more active allies in their enterprises digital transformation—otherwise they will cease to exist<sup>[34]</sup>. An example is Coca-Cola who recently re-organized and many of its traditional PMs had to find other jobs in the company or leave.

New ways of working are emerging in project management, creating the need for new leadership skills. These skills include an understanding of the impact of evolving technology on both major internal change projects and external customer deliverables. In today's marketplace, the project management organization (PMO) needs to be significantly involved in the enterprise's responses to the disruptions and the associated opportunities in leveraging the continuing exponential technological advances<sup>[39]</sup>.

Significant amounts of capital funds and talent are being wasted on poor project/program/portfolio performances, which impact innovation development and implementation; because<sup>[39]</sup>:

- Enterprises fail to bridge the execution gap between strategy design and delivery;
- Many executives don't acknowledge that strategy is delivered through projects; and
- Companies don't fully realize the basic importance of the project management discipline as a key driver of an enterprise's strategy.

Therefore, the PMO needs to continually figure out how to add business value. Innovative improvements in project controls software, methods, and processes will continue to automate the rote, routine, and mundane tasks of project management, including project controls and project reporting. This will change the context in which the project management discipline will operate and will further drive the need for the project manager, the PMO, etc. to be increasingly innovative. To survive, Project Managers (PM) must innovate themselves, those around them, the PMO, their roles, and their whole business space.

The strategic and broader management roles of the Project Management discipline are also being elevated as enterprises manage disruptive technologies. That is a key finding in the May 2018 PMI Pulse of the Profession<sup>®</sup>, In-Depth Report: *Next Practices: Maximizing the Benefits of Disruptive Technologies on Projects*. The report shows those that invest in project management experience better project outcomes. In fact, for innovators who embrace project excellence, 71% of those enterprises experience greater success with their strategic initiatives and higher project success rates—versus 60% of those that do not embed proven project management practices within their organizations.

The role of the project manager, according to that report, has expanded to one of a strategic advisor, innovator, communicator, big thinker, and versatile manager. Project managers are becoming even more valued as disruptive technology frees them from mundane routines, providing them more opportunity to innovate. Organizations look to their project managers to help take advantage of disruption – not just react to it – making effective project management practices more valuable than ever. “Innovator organizations prioritize three critical roles for the project manager working with disruptive technologies:

- Advocate for the technology (56% versus 41% of laggards);

- Supervisor for course correction (42% versus 31% of laggards); and
- Authority on disruptive technology (32% versus 21% of laggards).”

Innovators focus on using disruptive technologies to their benefit, driving agility and collaboration, and believe that the project professional should be the advocate and driver for adoption. According to the report’s survey, “Innovators use disruptive technologies to enhance the role of project management within their organizations to:

- Encourage greater efficiency and automation (75% versus 53% of laggards);
- Increase productivity (69% versus 59% of laggards);
- Promote the development of better products and services (61% versus 45% of laggards);
- Automate mundane tasks to free time for higher level work (59% versus 47% of laggards);
- Develop more strategic roles and leadership skills (57% versus 35% of laggards); and
- Build stronger connections among team members (44% versus 34% of laggards).”

Those enterprises that harness technology for project management, to change the way they operate and the way they manage projects, are now working in new ways.

### **Shape and Shift Organizational Culture and Structural Design**

Industry 4.0’s digital transformation is not just about devices and software. It must be accompanied by a shift in culture—one that trusts its personnel, empowers them with technology, and enables users to become the creators of change and innovation<sup>[13]</sup>. This is a cultural shift that reflects the decline in the utilization of functional management’s supposed expertise and the ascendance of skilled worker empowerment.

Since organizational culture is something that characterizes an enterprise, it can therefore be manipulated and altered to the enterprise’s advantage depending on the executive management’s leadership and personnel resources<sup>[31]</sup>. In addition, the design of the organizational structure must also be manipulated to reflect the requirements set by the desired changes in the organizational culture.

Therefore, the enterprise’s design of its organizational structure needs to reflect the way leadership can achieve the right combination of differentiation and integration of the enterprise’s operations management functions and project management functions. This design must support the enterprise’s strategies and related business objectives. The resulting structure will provide the hierarchical arrangement of lines of authority. It will determine how the roles, duties, power, and responsibilities are assigned, controlled, and coordinated. It will also establish the communications flow between and among the different levels of management and line personnel.

The innovation process within the innovation ecosystem is dynamic; therefore, organizational structure and culture must also be dynamic. Structure, culture, management, and strategy execution must respond to, align with, and support the enterprise’s strategy for innovation.

Andrew Pettigrew, said in 1979, when he introduced the concept of organizational culture<sup>[35]</sup>, that culture could and should be managed for the benefit of the overall company. Many

executives agree with this, yet simply do not understand how to do it, and if they do know how, other work constantly takes priority.

With the Millennial generation moving into the marketplace, the need to innovatively shape and shift the organizational culture and related structure has moved from a luxury to a necessity. To engage this younger generation and all generations, an enterprise must be an innovator of its organizational culture and structures.

Our research demonstrates that organizational culture must be managed to drive performance and innovation and to ensure that organizational structures align with the enterprise's strategies and business objectives. Failure to do so can result in a dramatic decrease in productivity and loss of innovation. We are finding that companies are gravitating towards organizational cultures that foster innovation, organizational learning, change management, risk taking, open communication, collaboration, teamwork, and diversity. These shifts also help companies become more agile and adaptive, and thereby better at proactively anticipating and reactively responding to change.

These modifications to the organizational culture and the supporting structure to implement an innovation management framework require actions, such as the following:

- Assess the enterprise's culture with respect to innovation, including current documented and undocumented principles and practices;
- Determine the ways in which the organizational culture supports the enterprise's innovation strategies;
- Change the cultural view of innovation to a business-oriented strategy-based view;
- Determine what constitutes having a learning culture within the organization;
- Design an optimal organizational structure for managing innovative ideas and the related work;
- Determine how organizational culture should shift to best support innovation management; and
- Proactively manage the culture by shaping and shifting the culture to support wide-spread innovation within the enterprise.

The final action is to implement any newly-developed innovation ecosystem principles, practices, and tools to fine-tune shifting the culture.

### **REPEATABLE PROCESS AND SUPPORTING TOOLS ENHANCE INNOVATION**

The migration of powerful technologies—digital devices and end-user-centric applications—into the hands of the end-user is reflecting a needed and significant shift within both business and project management operations. These are now critical parts of an empowered employee's workday. The creation of business software applications and their use by employees is now disrupting management structures and cultures, reshaping levels of responsibilities and authority, and driving innovation down into the hands of the individual employee. The rise in the use of digital devices and business applications by company personnel is having a profound impact on employee performance. This is reflected in collaboration fostered across a dispersed

workforce, increased productivity, higher job satisfaction, and accelerated decision making. Enlisting employee-level actions will lead to superior enterprise performance<sup>[23]</sup>.

These actions will ultimately make a difference on the company's bottom line from cost savings, wider margins, and revenue growth. These will result from a myriad of efficiencies and changes aggregated to improve performance at the enterprise level, which will be heavily driven by the enterprise's focused innovation within its marketplace. This in turn will be dependent upon the business process and tool applications employed in fostering innovation.

A repetitive process and tools for innovation are required to sustain executable creativity and to move strategically positioned ideas toward business value and benefits. Frequently, we find executives say their existing software, systems, methods, and other tools either do not support, or are not flexible or adaptable enough to support, an innovation process. Often operations personnel are stuck with existing tools and must make do as best they can, in trying to manage any innovation process.

Innovation processes and tools must support, enhance, and develop a creative mindset for innovation throughout the enterprise, and especially within both business management and project management disciplines. This is somewhat counterintuitive as we usually think of innovation being free form, unconstrained by structure, process, and tools. However, these are exactly what are needed to align innovation with strategy and to help assure an effective, efficient, and optimal pace of innovation.

The development and implementation of processes and tools for an innovation management ecosystem requires actions, such as the following:

- Determine how innovation happens today:
  - Where does innovation happen? And why does it happen there, and not elsewhere?
  - Is innovation effective?
  - Is innovation aligned with strategy?
  - Is there a disciplined, repeatable, effective, and efficient innovation process with goals, metrics, and governance?
  - And, perhaps most important, does the culture support innovation?
- Assess existing innovation processes and tools by focusing upon:
  - How are ideas and innovation proposals vetted and decided?
  - Are they adaptable to changing needs of innovation management?
  - Do they have sufficient automation, artificial intelligence, and machine learning?
- Determine if the existing innovation processes and tools provide innovation management information such as:
  - Retrospective analysis;
  - Idea related metrics;
  - What failed and why;
  - What worked and why;
  - Key Performance Indicator (KPI) metrics; and
  - Potential value adds.
- Determine the processes and tools that need to be modified, adapted, or added to meet management's needs in managing and controlling innovation in alignment with strategy;

- Determine changes needed to the processes and tools to make them flexible, nimble, adaptive, productive, efficient, and cost-effective in supporting innovation management; and
- Create an automated “Dashboard” that supplies the unique status information that the enterprise needs to control and manage innovative ideas and their development.

The management process for innovation uses agreed upon goals, metrics, and budgets, and a governance model with metered funding and gates. This requires specific agile management principles and methods that can foster and support a culture of, and processes for, innovation.

### **AGILE MANAGEMENT PRACTICES FOSTER INNOVATION**

A strategic plan for innovation is just ideas, *until it is put into action*. Unfortunately, most companies lack the flexibility and adaptability to execute planned innovation strategies. However, the latest statistics on agility and execution show that agile processes and best practices can make a difference. Agile management practices create an agile mindset and incorporate various agile models and methodologies that help foster an innovative mindset and a meta-innovation process.

Nine out of 10 executives, in a McKinsey survey spanning all regions and industry sectors, ranked organizational agility both as critical to business success and as growing in importance. In addition, nearly 90 percent of executives surveyed by the Economist Intelligence Unit ranked organizational agility as vital for business success<sup>[37]</sup>.

Our research shows *organizational agility* employs *organizational intelligence*. This reflects the capacity and capability of an organization to create knowledge, and use it to strategically renew itself, change quickly, adapt to a new environment or marketplace, and succeed in a rapidly changing, ambiguous, turbulent environment. It is the problem-solving capacity of an organization created by various subsystems. These subsystems include organizational structure, culture, stakeholder relationships, knowledge assets, and strategic processes.

But according to a recent McKinsey Global Survey on organizational agility—the ability to quickly reconfigure strategy, structure, processes, people, and technology toward value-creating and value-protecting opportunities—is elusive for most enterprises<sup>[28]</sup>.

Five distinct types of organizational agility—strategic, operational, business-portfolio, project-portfolio, and personnel—are needed for an enterprise to innovatively compete<sup>[25]</sup>.

- *Strategic agility* requires a combination of the patience to wait for the right time to act and the boldness to act when the strategic opportunity arises. This means probing and searching for opportunities to innovate, managing and mitigating risks, and staying in business until the right opportunity presents itself.
- *Operational agility* requires the capability to: exploit both revenue-enhancing and cost-cutting opportunities within the core business more quickly, effectively, and consistently than rivals; put into place processes to gather and share the information required to spot opportunities; and build processes to translate business priorities into focused action.

- *Both Business-Portfolio and Project-Portfolio* agility require the flexibility to reallocate resources, both cash and people, out of less promising areas and into more promising ones and without political considerations.
- *Human agility* involves personnel cultivating the mindsets, behaviors, and creative skills necessary to respond proactively to the unexpected and unplanned. It supports cultivating the emotional, visceral, and cognitive abilities to flow and flourish during uncertainty and volatility. It also includes cultivating the self-efficacy to trust ones' own, and others' judgments, competence, and capacity to be effective in changing contexts<sup>[30]</sup>.

The role of organizational agility in providing a competitive advantage is supported by a McKinsey survey. "Nine out of 10 executives, spanning all regions and industry sectors, ranked organizational agility both as critical to business success and as growing in importance. The McKinsey study also found that executives around the world believe that, in the 21st century's turbulent business environment, agility results in faster time to market, improved operating efficiency, more satisfied customers and employees, as well as higher revenues. In addition, nearly 90 percent of executives surveyed by the Economist Intelligence Unit ranked organizational agility as vital for business success. One-half of all CEOs and CIOs agreed that rapid decision-making and execution are not only important, but also essential to a company's competitive standing<sup>[37]</sup>."

Enterprises that focus on innovation to execute their business strategies become agile, manage changes, adapt, execute their work better, and outperform their business competition. Our experience has shown that agile management concepts and practices foster and support a culture of innovation and the flexible and nimble execution of innovative ideas. The enterprise's executives must listen, reflect, and work to change the organization's culture. They must build the organizational agility and adaptability to develop the enterprise's long-term ability to innovate its crucial core competencies on a sustained basis and to create new competencies.

An enterprise's agile nature, its business flexibility, is determined by its ability to adapt or conform to new or different conditions with nimbleness and flexibility, in a timely, effective, and efficient manner. Conversely, an organization's agility, adaptability, and leadership effectiveness are directly affected by the enterprise's ability to innovate. Therefore, in business, organizational agility, organizational adaptability, and innovation are intertwined.

Our research shows that agile enterprises are using principles from adaptive systems and complexity science. These principles enhance the capabilities of their organization to digest and comprehend information and innovative ideas, and to convert them to knowledge relevant to their business purposes and, thereby, achieve business success. This research underscores that today's enterprise can be looked upon as intelligent systems with complex processes involving large numbers of personnel interacting with diverse information systems. Our organizational research shows enterprises are engaged in learning processes using intuitive knowledge, information gleaned from the environment, hard data, lessons learned, and information stored in computer networks and retained by personnel—all of which are used in making business decisions. People and those diverse information systems foster the enterprise's ability to innovate and agilely adapt.

Instituting agile Operations Management and Project Management practices to foster innovation within an innovation management framework requires actions, such as the following:

- Identify the ways in which the enterprise responds to new or increased competition;
- Determine the organization's responsiveness to needed changes;
- Identify if the enterprise is basically reactive, or does it anticipate or create the future;
- Determine if personnel have, and can demonstrate, an adaptive mindset and agility in performing work;
- Understand the ways management personnel could shape where the organization is going, and how it will get there;
- Establish ways that line personnel can help shape the vision of the enterprise's destination;
- Establish if everyone – executives, manager, and individual contributors – is clear about what are their responsibilities with respect to innovation; and
- Determine if personnel know that they make a difference, and that they are shaping both their journey and the destination of the enterprise.

To flourish in the digital economy, enterprises need to become more agile; they must develop and release new products and services quickly, as soon as the market demands them. Further, in a business context, agility reflects an enterprise's ability to rapidly respond to, in both proactive and reactive ways, and then adapt to, internal innovative ideas and related changes occurring in the marketplace.

To outperform the competition, management must promote innovation and drive changes to products, processes, organizational structures, etc. These innovation driven changes must be executed in an adaptive, flexible, nimble, productive, efficient, and cost-effective manner through a formal change management process.

### **FORMAL CHANGE MANAGEMENT REQUIRED FOR INNOVATION**

Establishing an innovation ecosystem, to foster innovation across organizational functions, requires cultural, organizational, process, and structural changes. This necessitates using a formal change management process. Enterprises are more internally interconnected and processing more data, information, and innovative ideas than in the past decades. Employment demographics, processes, and technology are changing today's workplace, how businesses function, and the marketplace. We are living in a time of continuous innovative changes, which are more complex, are multi-disciplinary, have cross-functional impacts, and are changing markets.

To paraphrase what many pundits have said: If you continue do what you've always done, you'll continue to get the same innovation results you have been getting in the business. Therefore, changes need to be made to support innovation management, and those changes must be managed. These change efforts will meet with resistance, for many reasons, at various levels of the enterprise. This will necessitate reflecting upon and then addressing the implementation challenges to both innovation and the related organizational cultural and structural changes that are needed.

Expect push-back to the changes that need to occur within an enterprise when implementing innovation management. Addressing this push-back requires implementing a change management plan for each area of resistance. A few examples of potential areas where resistance to implementing innovation management can occur are:

- Improving operational innovation within the functional organizations;
- Changing the enterprise's culture to become more innovative;
- Organizational politics and the myopic self-interest of personnel who manage the competing permanent operational functions within the enterprise;
- Raising the enterprise's innovation management maturity level enterprise-wide;
- Establishing Organizational Project Business Management on an enterprise-level; and
- Overcoming an organizational culture where an enterprise-level PMO is viewed as a bureaucratic body or a project auditor<sup>[21]</sup>.

Corporations, like people, generally resist change. This is a common cultural norm because people normally do not understand why proposed changes related to innovation management are necessary or what impact the changes will have on them. This is the major reason behind most resistance-to-change, but it is seldom given sufficient consideration. Most personnel prefer the status quo to something new, especially when it involves how they perform their work or their internal organizational power-base. Organizational status quo is so tenacious with respect to resisting change and is so potent that desire and motivation aren't enough to foster change. That resistance must be artfully addressed and overcome to succeed<sup>[19,24]</sup>.

Enterprises need to focus on first modifying the perceptions and mindsets of personnel, then the collective-mindset of each internal organization, and finally the enterprise's culture. Robert Kegan and Lisa Lahey, in their book *Immunity to Change: How to Overcome It and Unlock the Potential in Yourself and Your Organization*<sup>[24]</sup> clearly demonstrate how the beliefs of individuals, along with the collective mind-sets within their organizations, combine to create a natural but powerful immunity (resistance) to change. In addition, they show that leadership, by pinpointing and uprooting their own immunities to change, can overcome the forces of organizational complacency and individual inertia, foster innovative change, and transform their enterprise into having both a growth mindset and innovation mindset. The associated resulting changes to organizational structure and culture must be carefully managed in response to, and in support of, the enterprise's innovative business strategies.

An example is Volkswagen's staying alive and intending to thrive with cultural and structural changes coupled with innovation. Volkswagen's new CEO Herbert Diess said in April 2018 that, in the wake of its cultural-based international scandal over diesel emissions, the automaker must "significantly step up the pace" of change. It must do this as it pushes into electric and self-driving vehicle technologies and focuses on offering temporary use of autos as a service. Diess said the company's goal would be "to forcefully and with focus press ahead" with the company's "Strategy 2025." That strategy includes increasing productivity by 25 percent, a new management structure, and building a more open, values-based culture. These changes will shakeup its insular, unique, and sometimes unwieldy corporate culture. Diess said the new management structure will bundle the company's dozen brands into just three divisions, which

would mean faster decisions as the company implements a broad strategy aimed at keeping up with changes in how people use cars.

To be successful, the organization must create and sustain an organizational culture and innovation ecosystem that anticipate changes, and then quickly, agilely, and effectively responds to and manages those changes<sup>[22]</sup>.

## CONCLUSION

New advances in technology (innovation) are disrupting all industries and thereby changing the functional roles and responsibilities of leaders and workers in both operations and project management. Gartner noted that over the next five years, the shift toward digital business (Industry 4.0) will impact almost all organizations directly or indirectly<sup>[34]</sup>.

As for what is driving the need for Innovation Ecosystem Management for most enterprises, as viewed from a more mundane perspective, is ‘What got you here won’t get you where you need to go’. Ad hoc or compartmentalized innovation will not be enough. Companies, and all their employees who are not situated in rote jobs, will need a culture of innovation, an innovative and growth mindset, and a supporting, disciplined, and repeatable innovation process. What is driving this need from the consumer level is the internet. This continues to make it easier for consumers to get educated and select the best value in products and services, and this almost always requires product and service innovation on the part of companies. We call this ‘delocalization of competition,’ where competition now comes from about anywhere. The ramp-up of innovative changes in the world marketplace is now non-linear. It is on the escalating up-sloping knee-bend of a hockey-stick shaped innovation paradigm, where to survive, an enterprise must quickly get much better at innovation in all areas. A case in point is that more than 3,600 US retail stores are expected to close in 2018.

Many enterprises find it difficult to capitalize on innovations. The reason is their operations support minimal innovation. In addition, the culture, structure, and agility of their internal business model is only adequate to currently make them competitive in their existing business. This makes them inadequate and unable to compete for delivering any marketplace disruption or acquiring dominance based on innovation.

Disruptive innovation is risky business. It represents something new and involves experimentation, which means stepping into a vague and uncertain future. This quest towards change is a challenge to the status quo, a move toward something different with potential risk and with the deliberate intention of creating value.

Innovation is a business necessity in the leadership of project, program, and portfolio management. Innovation is everyone’s business within the enterprise. The business inflection point for innovation within any enterprise is that moment when talented and motivated people seek, and are given, the opportunity to act on their ideas for the betterment and advancement of the company.

The most experienced executives and managers understand that to succeed, they must accelerate the pace of innovation, take more risks, and employ agile management practices. This means using appropriate organizational structures, systems, processes, and tools to foster innovation. Every enterprise needs to develop a real solution, a framework, for innovation. This must respond to the business as it evolves, and guide internal innovative ideas, while addressing external forces so the business can seize new opportunities. Our approach to innovation can be

applied within any functional organization (Operations, PMO, Finance, etc.) as well as everywhere within the enterprise.

Executives conceptually understand the changes that Industry 4.0 will bring, but they are less certain how they can act to benefit from those changes. To make sure that they remain competitive, enterprises are working on multiple product, service, and digital transformation initiatives. Examples include improving how efficiently their information technology operations work, transforming their customers' experiences and interactions, and increasing their overall business efficiency. But for many organizations, there are still huge barriers to transformation such as lack of resources, misalignment between information and digital technologies and the rest of the business, and cultural integration. All executives know that changing the enterprise's organizational culture to support an innovation management process is difficult. However, making this change is necessary to ensure the enterprise operates creatively, efficiently, effectively, and agilely to serve both internal and external customer's needs and address stakeholder requirements.

Establishing a managed innovation ecosystem requires the management of organizational-structure changes and cultural changes, to foster innovation across and within organizational functions. This also requires an Organizational Project Management strategy, structure design, and culture that is harmonious within the enterprise, promotes innovation, and can affect business strategy realization through project management. Our research and experience has shown that specific principles, practices, tools and repetitive processes are required for innovation to blossom. These tools for, and a repetitive process for, innovation are required to sustain executable creativity.

The enterprise's business units, including the PMO, must be responsible for managing innovation, using agreed upon goals, metrics, and budgets, and a governance model with metered funding and gates. This requires application of those specific agile management principles and methods that can foster and support a culture of innovation.

Though every enterprise and its PMO has, in some form, its own innovation ecosystem, few understand and actively manage and evolve their ecosystem. The enterprise's innovation ecosystem must tie to and support the enterprise's business strategies and the related project management strategies. By understanding what an innovation ecosystem is, and by managing that ecosystem, the enterprise creates its own innovation machine. In this Industry 4.0 era, with five generations in the workforce, those that develop and manage their innovation ecosystems on an enterprise-wide basis will outperform all others and will thrive within an increasingly competitive marketplace. Global markets are, and will continue to, rapidly change and customers will become more demanding. Organizations that innovatively respond more effectively and with agility will achieve the greatest financial success.

Virgin Galactic is a current case study of carrying out bigger-than-life strategic innovation initiatives. Its strategic initiative is to carry tourists on suborbital hops into the lower reaches of space where they can see the Earth far below and the stars beyond. Virgin Galactic envisions a fleet of spaceships operating from its Spaceport America in New Mexico and offering flights for research and satellite deployment. Virgin Galactic's planned space flight features an air launch of a Virgin SpaceShip followed by a rocket-powered ascent at three and one-half times the speed of sound, the silence of space, several minutes of out-of-seat weightlessness, and multiple windowed views of the earth below.

On 6 April 2018 Virgin Galactic conducted the first powered flight of its latest spaceship VSS Unity, which was lifted aloft by VMS Eve and after being released ignited its engine for a flawless sub-orbital flight. The craft's unique innovative twin tail booms, which function like the feathers of a badminton shuttlecock, were raised to slow and stabilize Unity during the initial stages of descent, and then lowered to their conventional configuration in the lower atmosphere, with a smooth runway landing after reentry. Virgin Galactic's growing commercial *spaceline* fleet consists of the all-carbon composite SpaceShipTwo rocket-plane, named the VSS (*Virgin Spaceship*) *Unity*, which is designed to take a crew of two pilots and up to six passengers into space. The fleet has two dedicated carrier aircraft. The first is the WhiteKnightTwo VMS (*Virgin Mothership*) *Eve*, which is a twin-fuselage jet-airplane functioning as the carrier-launch-platform mothership for Virgin Spaceships. The other is the 747-400 jet-airplane *Cosmic Girl* for the *LauncherOne* small earth-orbiting satellite launch service.

Virgin Group chairman and Virgin Galactic founder and visionary Richard Branson said, "Together, we can make space accessible in a way that has only been dreamt of before now, and by doing so can bring positive change to life on Earth. Our beautiful new spaceship, VSS Unity, is the embodiment of that goal and will provide us with an unprecedented body of experience which will in turn lay the foundations for Virgin Galactic's future. Her creation is also a great testament to what can be achieved when true teamwork, great skill (innovation), and deep pride are combined with a common purpose."

Virgin Galactic's continuing success is also a testament to how even a major enterprise can effectively employ an innovation ecosystem on an enterprise-wide basis to accomplish specific innovative, strategic, and transformational initiatives.

Many enterprises already have a basic strategy of continuous improvement in their business operations, but they still need to instill a culture of innovation, change, and evolution in how things work. If an enterprise doesn't innovate, manage its innovation ecosystem, and radically transform its business, it will find itself fast losing market-share to its competitors. Or, wiped-out by completely unexpected market disruptors such as the Apples, Googles, Amazons, eBays, and Craigslists of the world.

Industry 4.0's digital transformation is driving a shift to different management environments and cultures, with the enterprise's business powered by employee innovation initiatives and management trust. Companies will either be winners or losers because of innovation within this Industry 4.0 digital landscape. One key factor is that the winners will be those who truly enable their workforce to innovate and drive digital transformation. Culture, structure, trust, empowerment, collaboration, access to devices, access to applications, and sharing control are all important. However, it will be human beings, their talent, the PMO, and their leaders—not robots—that innovatively transform enterprises.

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## About the Authors



### **Darrel G. Hubbard, P.E.**

California, USA



**Darrel Hubbard** is President of D.G.Hubbard Enterprises, LLC providing executive consulting and assessment services. He has over 50 years of experience in consulting, line management, and technical positions. He has served as a corporate executive officer; managed information technology, proposal, accounting, and project management organizations; managed the due diligence processes for numerous mergers and acquisitions; was a program manager on engineering projects; was a project manager on commercial projects; and a designated “key person” under government contracts. He has also held executive positions in, and was professionally licensed in, the securities and insurance industries.

He assists organizations, as a Subject Matter Expert (SME) consultant, to achieve their enterprise’s strategic business and tactical objectives. He provides analysis of their management structures, business processes, general business operations, and project and business management capabilities, while supplying specific recommendations on business, methodology, toolset, and process improvements. Mr. Hubbard also assists companies, as an out-side third party, with the intricacies of the due diligence process in their merger and acquisition activities. He also supports companies in the managerial development and establishment of Organizational Project Management (OPM) and their Project/Program/Portfolio Organizations (PMOs) and provides workshops and seminars focusing on the business management aspects of the project management discipline.

Mr. Hubbard holds a bachelor’s degree in mathematics and physics with a minor in chemistry from Minnesota State University at Moorhead. He is a registered Professional Engineer in Control Systems in California. Mr. Hubbard joined the Project Management Institute (PMI) in 1978 (#3662), is a charter member of the PMI San Diego Chapter, and was deputy project manager for the Project Management Body of Knowledge (*PMBOK® Guide* Third Edition ANSI Standard by PMI. He was the Exhibitor Chairperson for the 1993 PMI North American Congress/Seminar/Symposium, is a published author of many articles, a presenter at many PMI Congresses and other Project Management Symposiums, a keynote speaker, and a guest speaker at PMI and IIBA Chapter meetings. Darrel is also a Life-Member of the International Society of Automation (ISA).

He is a contributing author to *The AMA Handbook of Project Management*, AMACOM, 1993 and *The ABCs of DPC: A Primer on Design-Procurement-Construction for the Project Manager*, PMI, 1997. He is the co-author with Dennis L. Bolles of *The Power of Enterprise-Wide Project Management: Introducing a Business Management Model Integrating and Harmonizing Operations Business Management and Project Management*, hardcover – AMACOM, NY, 2007; revised and retitled in paperback, *The Power of Enterprise PMOs and Enterprise-Wide Project Management* – PBMconcepts, MI, 2014; *A Compendium of PMO Case Studies – Volume I: Reflecting Project Business Management Concepts* – PBMconcepts, MI, 2012; and *A Compendium of PMO Case Studies – Volume II: Reflecting Project Business Management Concepts* – PBMconcepts, MI, 2016.

Darrel can be contacted at [Darrel.Hubbard@dghellc.com](mailto:Darrel.Hubbard@dghellc.com) and on *LinkedIn* at <http://www.linkedin.com/in/DarrelGHubbard>. Visit the PBMconcepts website at [www.PBMconcepts.com](http://www.PBMconcepts.com) for information about current and future book projects.



## **Peter W. Rogers**

Georgia, USA



**Peter Rogers** is CEO of P17 Group LLC, and Senior Innovation Consultant at The Experience Praxis Group, Inc. He has over 40 years of experience in consulting, training, and executive management. He has served on boards of directors; and as head of an enterprise PMO; master facilitator; master trainer; master scheduler; lead consultant; portfolio, program, and project manager; adjunct professor and guest lecturer at Florida International University and several other colleges and universities; and speaker. Peter has founded and launched four of his own successful companies, and contributed to the startup and success of several other companies, including one that went public on NASDAQ.

Peter works with CEOs, top teams, other leaders, and managers in the space between strategy development and implementation to assure that organizations have the optimal structure, culture, and project/work delivery systems to achieve their goals and strategies. He assists with organizational restructuring and shifting culture to include a ‘culture of innovation’, and innovative and growth mindsets. He has provided these services to many Fortune 500 companies, including Microsoft, Starbucks, Chevron, Hewlett Packard, Boeing, PACCAR, Weyerhaeuser, Abbott, and others.

Peter holds a bachelor’s degree in biological oceanography, and masters’ degrees in economics and marine policy, all from the University of Washington, Seattle, Washington. He joined the Project Management Institute (PMI) in 1985 and was a work stream lead as a member of the core team of PMI’s Organizational Project Management Maturity Model (OPM3) project. He is a published author of several articles, a presenter at various project management symposiums, a keynote speaker, and a guest speaker at various functions. He has recently spoken at conferences in Dallas, Singapore, Shanghai, Prague, Noosa, and other locations on topics ranging from business agility and Agile, managing culture, managing innovation, to influencing, presenting, and emotional intelligence.

He is co-author of *Project Management Made Simple and Effective*, Dog Ear Publishing, IN, 2016, and contributing author to *Business Innovation Results: How to Avoid 5 Innovation Traps the Doom Bottom-Line Results*, Dog Ear Publishing, IN, 2017; *Turn Great Ideas into Reality: Develop and Present a Winning Business Case*, Dog Ear Publishing, IN, 2011; and *Passing the PMI Scheduling Professional (PMI-SP)<sup>(c)</sup> Certification Exam the First Time*, Dog Ear Publishing, IN, 2017.

Peter can be contacted at [Peter@p17group.com](mailto:Peter@p17group.com) and [Peter.Rogers@experiencepraxis.com](mailto:Peter.Rogers@experiencepraxis.com), and on *LinkedIn* at <https://www.linkedin.com/in/peter-rogers-982a7214/>