BUILD USA

PRESENTS

BUILDING IS CHANGING ARE YOU?

White Paper One

Sponsored By: SYNTECGROUP

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EXECUTIVE SUMMARY

Building is changing! This is the first white paper (WP) in a series of four. The series will:

- WP #1 will briefly explore building's history and current environment.
- Then WP's #2 and #3 will review the pressures and opportunities that are driving change in Building.
- Finally, in WP #4, specific tools and solutions will be introduced.

BACKGROUND

IT HAS BEGUN.

The digital revolution has begun. Over the course of the last decade, **the rise of digital technology** has transformed industries such as automotive, banking, healthcare, media and entertainment, retail, and others. Innovation has helped companies in these industries increase productivity and sustainability, improve communication, cut costs, and create new jobs.

However, during this same period, the building industry has continued to function as it has for the past half century. Most companies still rely heavily on:

- **manual labor**
- **mechanical technologies**
- **traditional products and services**
- **traditional business models**

A NEW PRACTICE

In contrast to most other industries, building has been reluctant to embrace new technology. Executives, project owners and other industry stakeholders have consistently resisted the full-scale adoption of digital solutions. Many believe that implementing new technology is impractical or unprofitable. Applications of digital technology are often one-off solutions for particular problems.

Building is among the least digitized sectors in the world! As a result, productivity has stagnated.

THE MARKET

GLOBAL INDUSTRY MARKET DYNAMICS

The slow pace of innovation in building is important not only for individual stakeholders, but also because of the industry's role in the global economy.

An $11-trillion-a-year industry, building accounts for **6%** of **global GDP**

It employs about **7%** of the world's working-age population (more than 100 million people worldwide).

$17.5 trillion is predicted for global construction spending by 2030.

Building is the world's largest consumer of raw materials and other resources, using about **50%** of global steel production and more than 3 billion tons of raw materials.

MARKET DATA

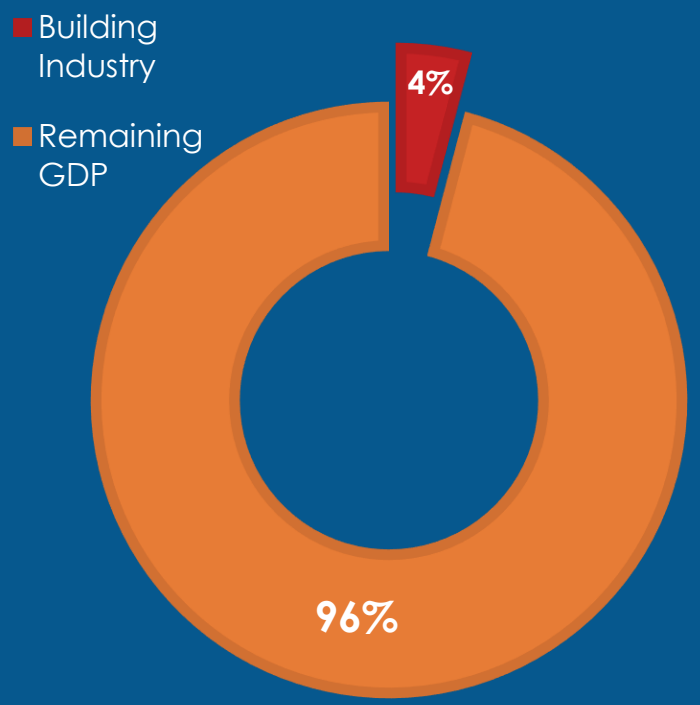
- The construction market in the United States is one of the largest in the world, with private construction spending reaching around 997 billion in 2019 with 11.2 million people employed.
- 50% of engineering and construction professionals report one or more underperforming projects in the previous year.
- 29% of firms are putting longer completion times into their bids for new work because of the lack of workers, putting future development and infrastructure projects at risk.
- Just 25% of projects came within 10% of their original deadlines in the past 3 years.
- Only 31% of all projects came within 10% of the budget in the past 3 years.
- Large projects typically take 20% longer to finish than scheduled and are up to 80% over budget.

- $1.3 trillion is the total worth of U.S. construction industry in 2019
- ★ New construction put in place is forecasted to reach over 1.53 trillion dollars by 2022.
- Industry needs to build 13,000 buildings each day between now and 2050 to support an expected population of 7 billion people living in cities.
- ★ 58% of owners said they've used or plan to use design-build, moving away from traditional design-bid-build.
- ★ 23% of firms report they are taking steps to improve jobsite performance with lean construction techniques, tools like BIM, and offsite prefabrication.
- ★ 6.5% compound annual growth rate (CAGR) in modular construction by 2026 is predicted

A 1% rise in productivity nationwide could **save $100 billion a year.**

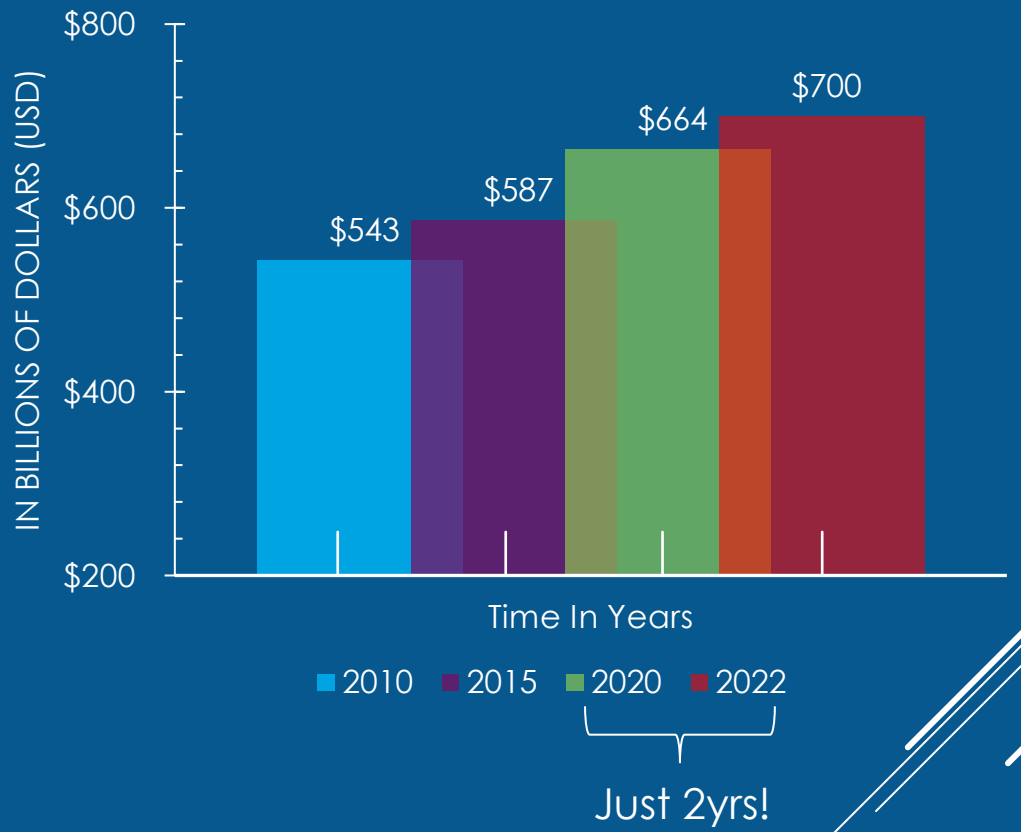
WHY IT MATTERS.

GDP DATA FOR DOMESTIC ANALYSIS



Building's GDP to Scale With Total U.S. GDP (Q3 2020)

GDP From Construction in The United States



Within ten years, according to our estimates, full-scale digitalization will lead to huge annual global cost savings. For commercial construction, those savings will be $0.7 trillion to $1.2 trillion (13% to 21%) in the design and E&C phases and $0.3 trillion to $0.5 trillion (10% to 17%) in the operations phase.

OUR ESTIMATES

ON A LARGER SCALE

Even the outsize numbers do not do justice to building's impact on the global economy and environment. Updates in the built environment are often the drivers for consumption in many other economic sectors. Plus, the built environment is a primary anchor for stability, confidence, and growth within every community.


DIGITAL
TRANSFORMATIONS

INNOVATION

Thanks to the recent development of new technologies, tools, and techniques, the industry has vast potential for improving productivity.

By leveraging the power of these technologies, companies can boost productivity, reduce costs, streamline project management, enhance quality and safety, and help keep projects on time and on budget.

INNOVATION

Innovative solutions are now available for all project phases, from strategic planning and design, through pre-construction, to operations and ongoing life maintenance.

Technologies & building products that are beginning to affect the entire industry:

- 5G
- Cloud Computing
- Common Data Environments
- Big Data Analytics
- Building information modeling (BIM)
- Drones
- Wearables
- Wireless sensors
- Augmented and virtual reality
- 3D scanning and printing
- Automated and robotic equipment
- Advanced building materials
- Prefabrication and new **modular building methods**

WE ARE STILL IN THE "COCOON"

In the near future, industry-wide adoption of digital technology will disrupt traditional workflows, processes, and ways of doing business. The building industry is **poised** for digital transformation.

With the pace of change accelerating, players along the industry value chain would be wise to develop new business models-- and a new mindset-- to confront the challenges that inevitably accompany change.

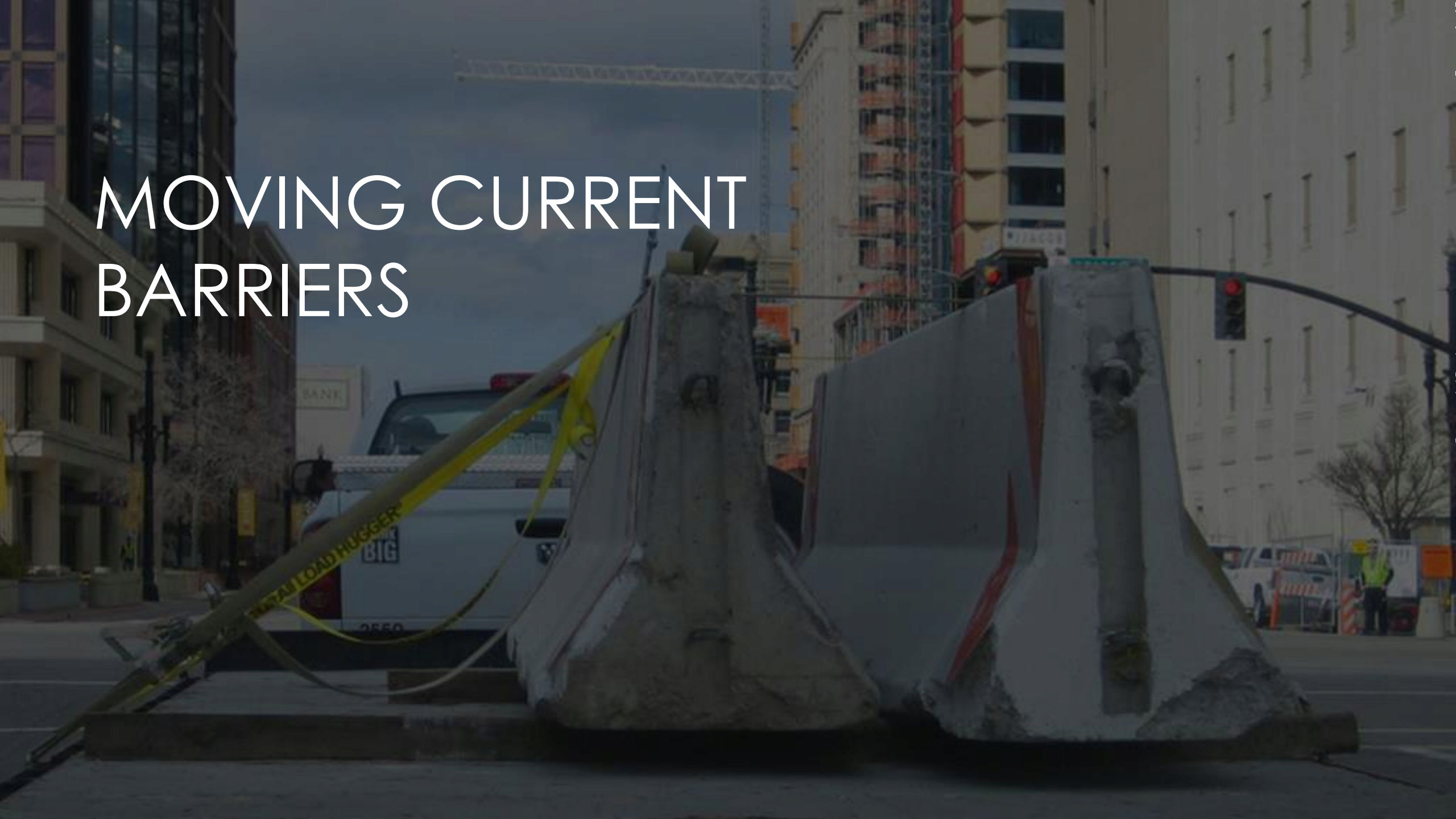
WHAT IS TO COME WITH THIS TRANSFORMATION

DIGITALIZATION

Although the industry is still learning how to best implement them, collaborative digital platforms can change project outcomes by empowering people to work smarter, communicate more easily, and track projects more effectively.

LEFT IN THE PAST…

The companies that resolve to address these challenges head-on will emerge as leaders in the post-digital world.



MOVING CURRENT BARRIERS

BARRIERS TO CHANGE

Why have so few companies adopted digital solutions and fully digitized their operations?

The answer lies in the following traditional processes and procedures that have evolved over **history** within the deeply fragmented, risk-averse building industry.

THE ANSWER.

Fragmentation

Lack of Standardization

Transience

Decentralization

Silos in Project Management

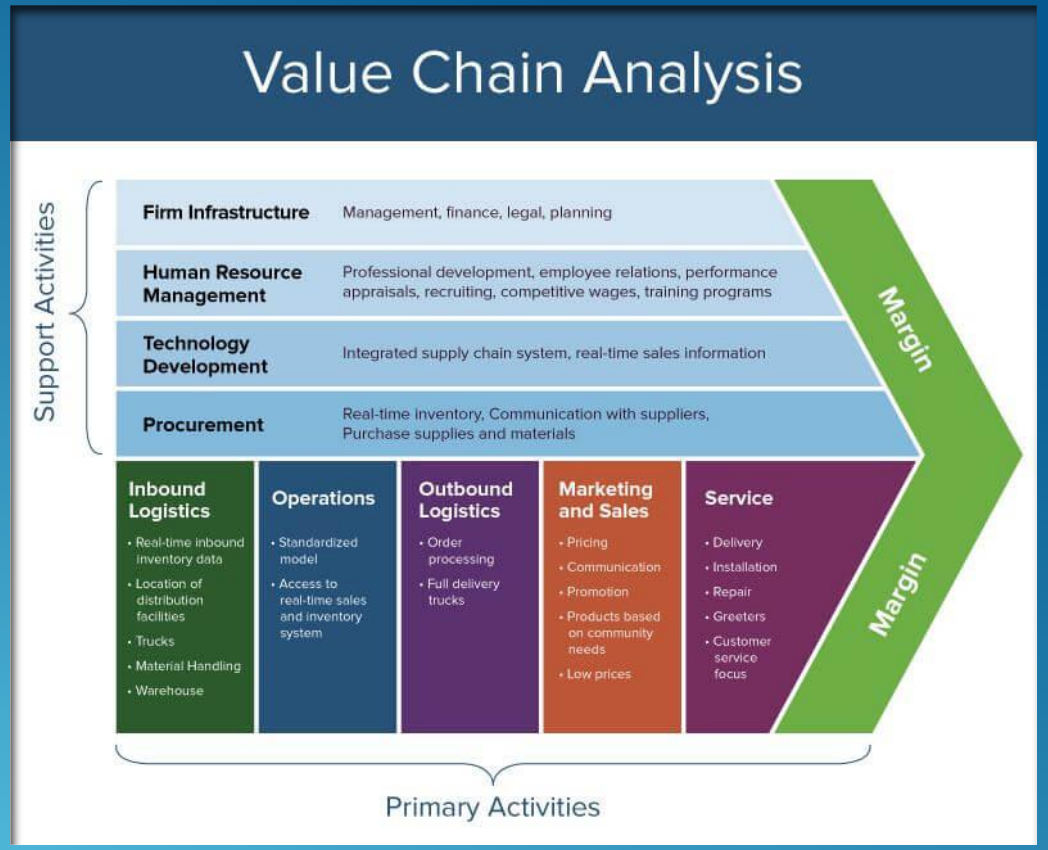
Minimal Investment in R&D

Conservative Culture

Workforce Talent

BARRIERS TO CHANGE

The following characteristics of the building industry make digital transformation particularly challenging:



FRAGMENTATION

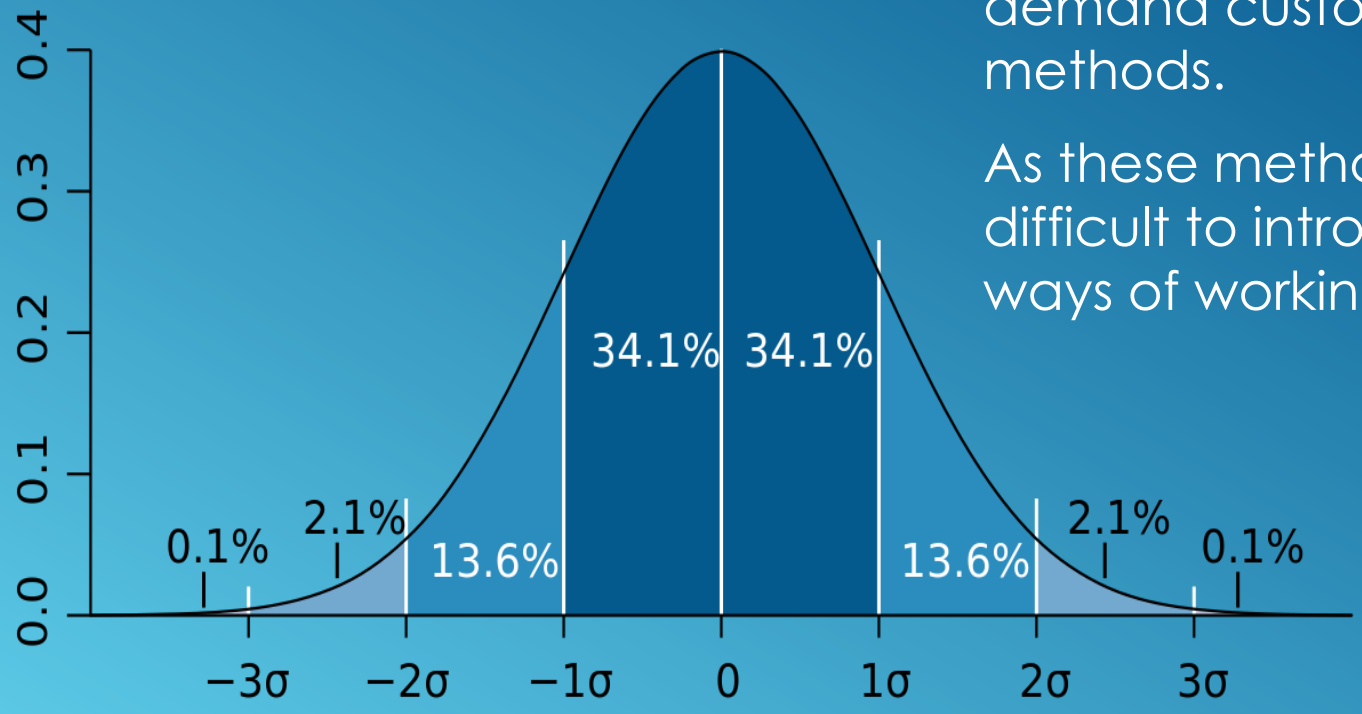
The building industry is characterized by a highly **fragmented value chain.**

Each step in the chain involves a multitude of:

- independent contractors
- subcontractors
- suppliers

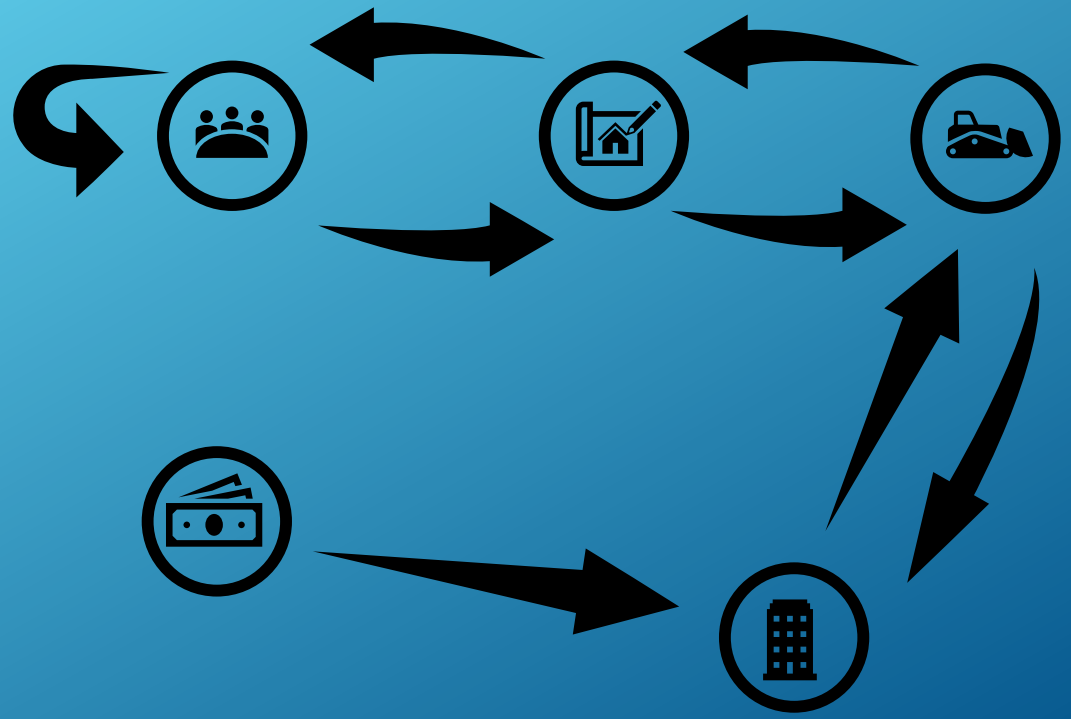
Further, these players often find themselves at odds with each other due to the short-term and adversarial nature of construction contracts. This set of conditions hinders the seamless data flows and integrated systems that robust **digitization requires**.

LACK OF STANDARDIZATION



Construction projects are nearly always one-off endeavors, with **unique requirements** that demand customized design and delivery methods.

As these methods are rarely repeated, it is difficult to introduce changes and establish new ways of working across multiple projects.



TRANSIENCE

Workforce turnover in the building industry is high. Each construction project typically involves a brand-new set of stakeholders, organizations, and project teams. These groups have little incentive to embrace new technologies or work processes during the brief period of time when they are working together on a project.

21.4% industry-wide construction employee turnover rate in this field, making it one of the highest rates among any industry.

The average cost of a turnover is up to 20% of the individual's base pay.

Large companies often consist of multiple business units that tend to follow their own processes and procedures. Individual construction projects take place at sites that are far away from the company office. Many sites are located in harsh or remote environments. Few sites are conducive to teaching workers how to work in new ways or master new technology.

DECENTRALIZATION

SILOS IN PROJECT MANAGEMENT

The building world is filled with walled off **silos of knowledge.** Companies are often rewarded for zealously guarding their project data—even if this secrecy is detrimental to overall project. In today's market the obfuscation of knowledge often offers a competitive advantage over transparency. What is more, individual teams and business units will often develop their own digital solutions without coordinating with others.

MINIMAL INVESTMENT IN R&D

Research and development is vital for the renewal of any industry. Yet building companies invest much less in R&D than their peers in other industries (less than 1 % of revenues, versus 3.5% to 4.5 % for the auto and aerospace sectors).

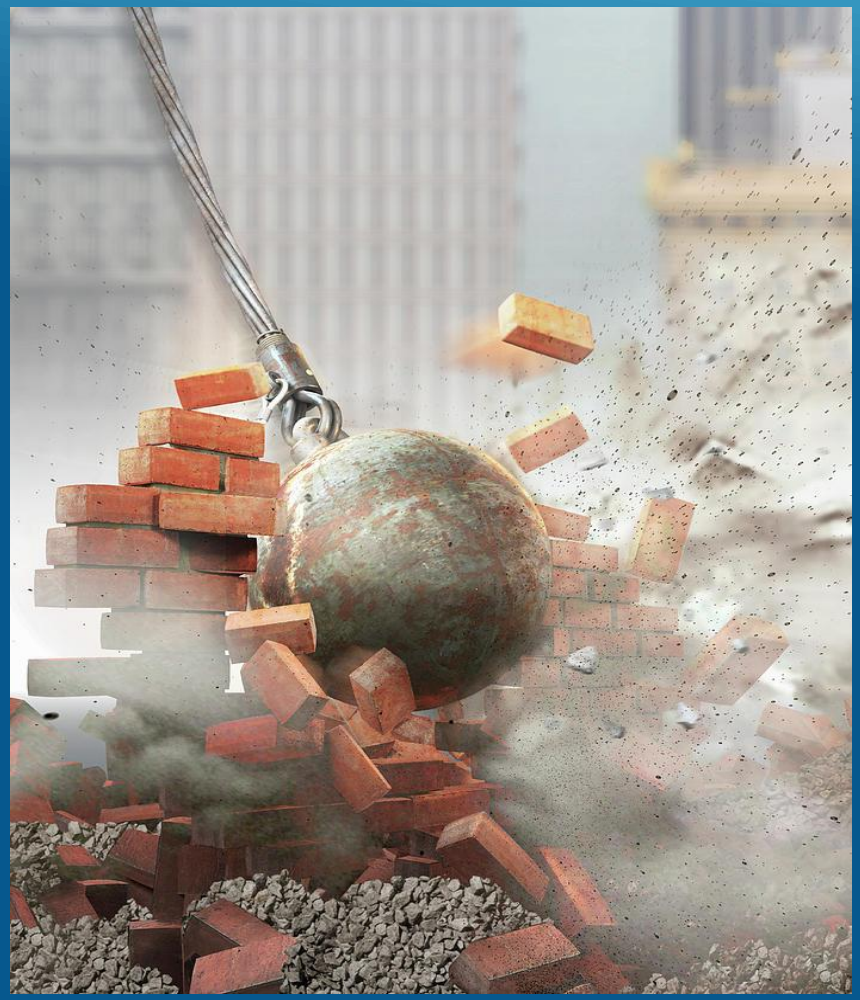
The benefits of R&D are long-term, the costs short-term. This is an unappealing trade-off for project-driven companies confronting shrinking profit margins and stagnant productivity.

The building industry retains a conservative culture which does not nurture progressive thinking. Too often, the industry mindset is oriented toward the past, not the future. Since companies often have established processes for dealing with perennial problems, they may have difficulty adopting more innovative solutions.

CONSERVATIVE CULTURE

Finding digital talent is a primary concern for executives across the building industry. However, a negative perception of the industry, along with a lack of programs for upskilling the current workforce, makes it difficult to attract the required talent and close a significant talent gap.

WORKFORCE TALENT



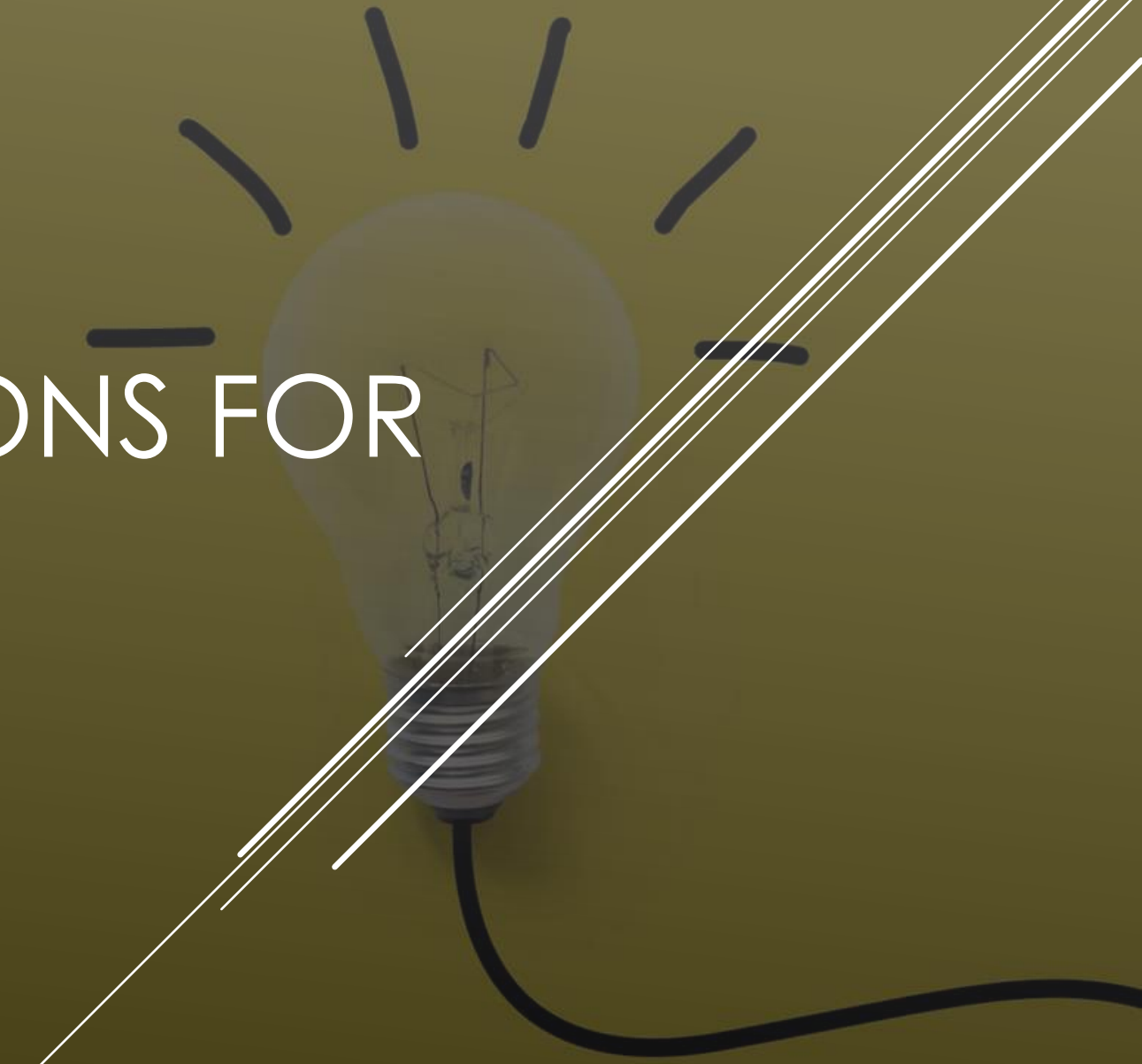
Companies should expand their talent searches, strive to improve the industry's image, and establish continuous learning and development practices.

In addition, to appeal to **the new generation** of workforce talent, companies should project a positive brand image that reflects the innovative technology and sustainable practices of the 21st century.

Over the next 10-15 years, as the younger generation takes on management roles and starts to control decision-making, many barriers to entry will begin to disappear.

REMOVING THE BARRIERS

RECOMMENDATIONS FOR ACTION



RECOMMENDATIONS

For the first time in its history, the building industry has access to robust technological solutions that can dramatically increase integration across the value chain.

Technologies such as BIM have the capacity to break down traditional silos, enable real time **knowledge sharing**, and promote **collaboration** among previously disconnected organizations.

SILOS

If digital technology is successfully integrated across the entire building team, the benefits will increase exponentially

In today's world, advanced building teams are making real incremental progress. However, the silos within the building world makes it difficult to implement new technology.

RECOMMENDATIONS

Companies can promote positive outcomes by implementing new technology in sync with corresponding changes in organizational processes and project workflows. To this end, companies can take specific steps in the following areas:

- *Corporate Culture*
- *Leadership*
- *Implementation Strategy*
- *Legal Contracts*
- *Financing Agreements and Insurance Products*
- *Organizational Changes*
- *Talent Management*
- *Silos*

CORPORATE CULTURE

In creating an organizational structure that supports digitization, leaders must recognize that digital transformation is about more than just test-driving trendy technology or pursuing innovation for innovation's sake. It's about creating a **people-first culture** supported by powerful digital tools and workflows.

LEADERSHIP

The ultimate purpose of innovation is to make human lives better by improving living conditions and working conditions. To achieve this purpose, we need effective, forward-thinking leaders that can utilize technology in more meaningful and impactful ways.

IMPLEMENTATION STRATEGY

Many industry players introduce new digital tools into their organizations without first educating workers about their benefits or modifying workflows and processes. Technology adoption takes time and should be guided by a systematic strategy. A good plan will include clear goals, realistic timelines, and specific measures of success. Executives and managers must start with a clear definition of how digital will create value.

IMPLEMENTATION STRATEGY

They should communicate why these changes are important as well as their impact on organizational structure—For example, by citing the positive effects on cost, schedule, and risk optimization. During the transformation, they should spend as much time on operational change as they do fine-tuning new technology.

This approach helps focus each solution on a real business need while at the same time encouraging buy-in among the workforce. The ultimate goal is to increase collaboration along the value chain by seamlessly integrating new digital tools into daily operations.

LEGAL CONTRACTS

Traditionally, industry stakeholders have viewed construction contracts as opportunities to transfer risk to potential adversaries or competitors. Instead, contracts should be seen as mutually beneficial tools that ensure an equitable distribution of both risks and rewards. Contracts may clearly outline responsibilities and enable owners and contractors to share the benefits that arise from the adoption of innovative technologies and practices.

FINANCING AGREEMENTS & INSURANCE PRODUCTS

- The financial services and insurance products available in today's business environment still reflect historical prejudices about how risk is shared and mitigated.
- Insurance and financial partners should create new products and services that more accurately reflect the new environment of reduced risk in the building industry.

ORGANIZATIONAL CHANGES

Industry players are experimenting with **new collaborative paradigms** for the digital age. These new paradigms contrast with the traditional grouping of architect, engineer, general contractor, and design-and-build contractor.

Two emergent organizational models will successfully differentiate themselves soon:

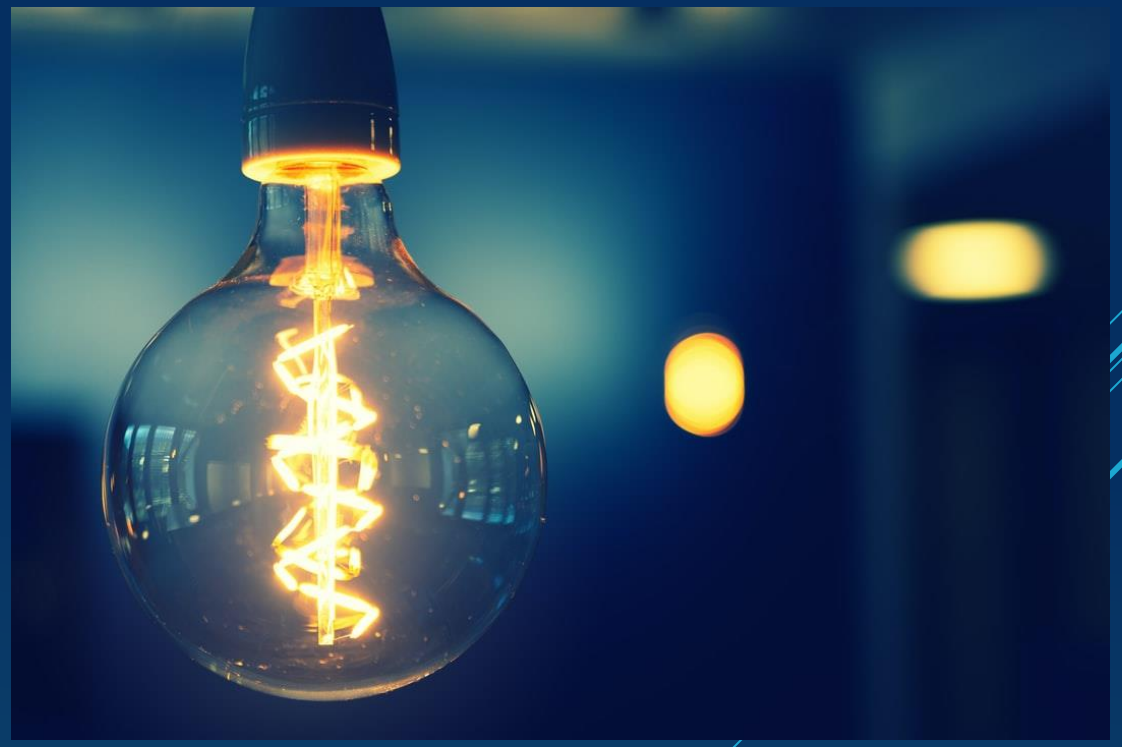
- ***Internally Integrated Business Conglomerates (IIBC) –*** Organizations of the IIBC model are represented today by large-scale companies like Bechtel and AECOM that have complete verticals in almost all market sectors and services.
- ***Collaboratively Integrated Partner Organizations (CIPO) –*** The CIPO model refers to small and mid-size firms who have developed strong individual brands and cultures, yet choose to join collaborative organizations that can pool the required skills, processes, and resources to compete on projects of all scales and remain nimble enough to quickly adjust to market shifts.

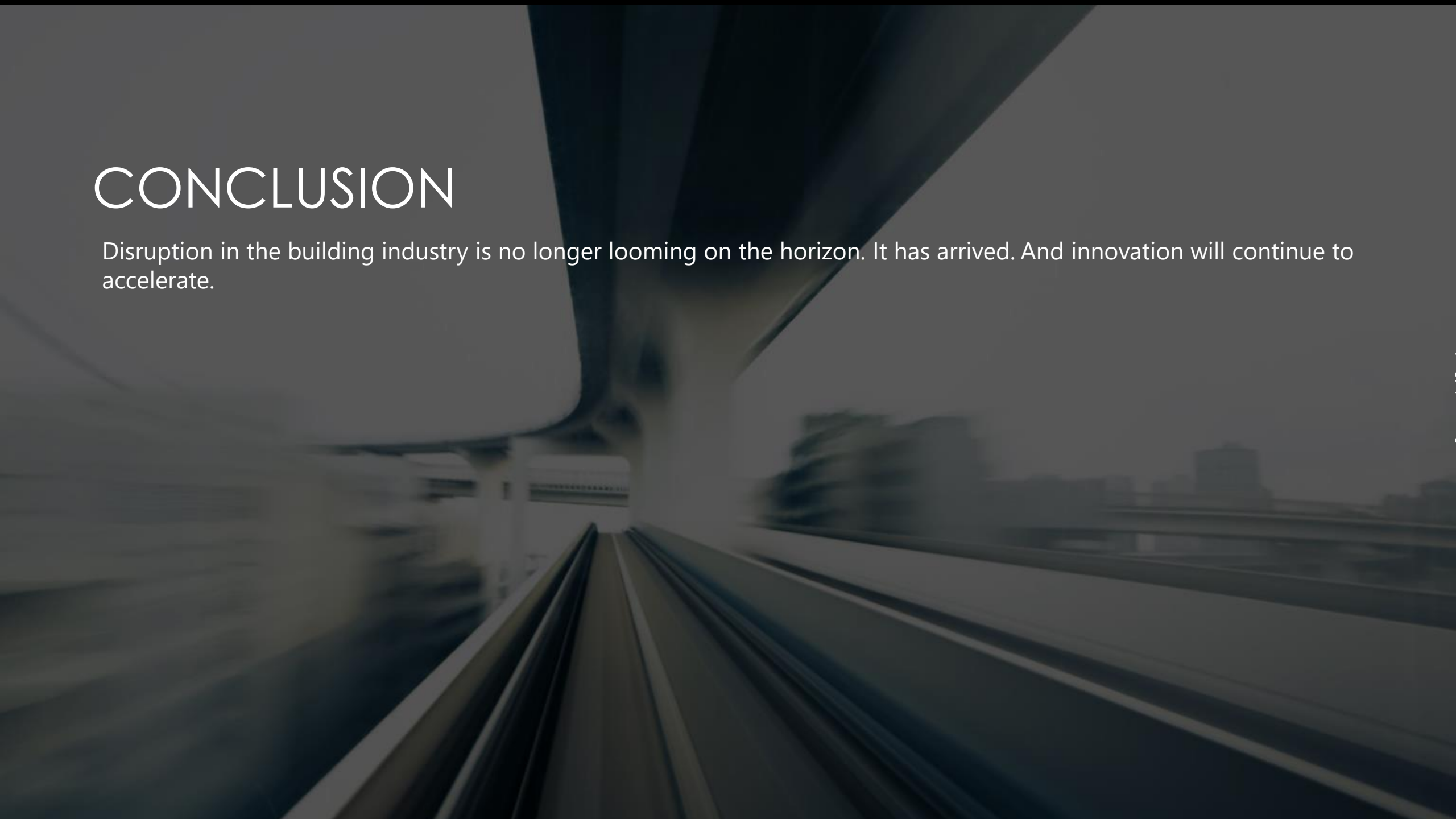
TALENT MANAGEMENT

Recruiting new talent and upgrading the skills of the existing workforce should be priorities for companies who want to become leaders in a post-digital world. Today, most companies lack adequate upskilling processes, as well as a long-term strategy to attract, recruit, and retain talent.

Companies should expand their talent searches, strive to improve the industry's image, and establish continuous learning and development practices. In addition, to appeal to the **new generation** of workforce talent, companies should project a positive brand image that reflects the innovative technology and sustainable practices of the 21st century.

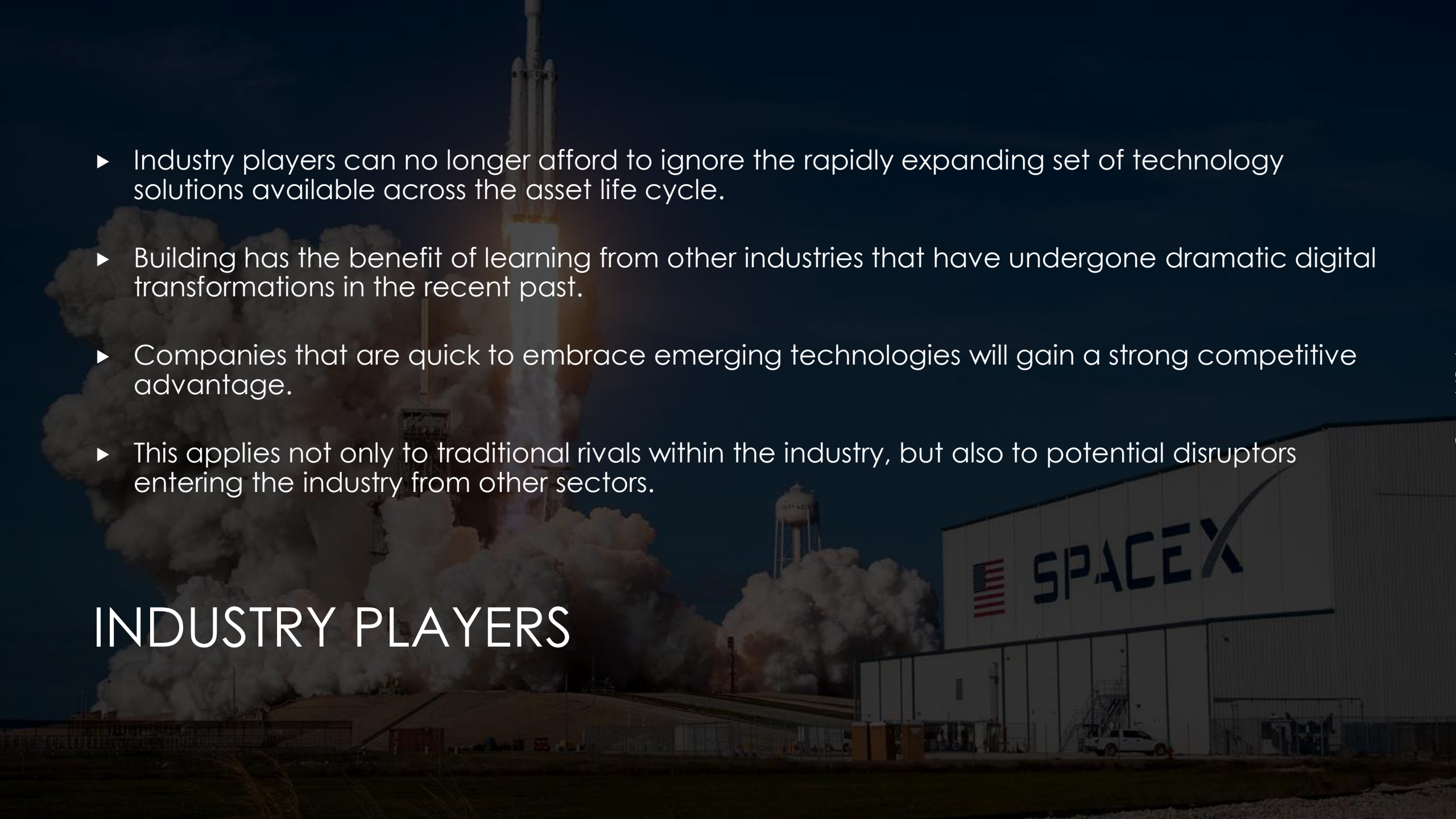
Over the next 10-15 years, as the younger generation takes on management roles and starts to control decision-making, many barriers to entry will begin to disappear.





CONCLUSION

Disruption in the building industry is no longer looming on the horizon. It has arrived. And innovation will continue to accelerate.



- Industry players can no longer afford to ignore the rapidly expanding set of technology solutions available across the asset life cycle.
- Building has the benefit of learning from other industries that have undergone dramatic digital transformations in the recent past.
- Companies that are quick to embrace emerging technologies will gain a strong competitive advantage.
- This applies not only to traditional rivals within the industry, but also to potential disruptors entering the industry from other sectors.

INDUSTRY PLAYERS

Technology is a powerful tool, but it is not the central story. The focus should always be on "**people**"; our clients, staff, vendors, partners,… There is a big list of people relationships in the world of building.

As technology takes on more and more of the tasks job there will be rapid staff growth in the areas of data analysis, strategic planning and authentic customer service.

Professionals who are tasked with ensuring that the "Building Experience" is understood, enjoyed, made relevant and perceived to be valuable. Not exactly the descriptive attributes most people would currently apply to building.

PEOPLE.

Questions May Arise?

How do we create a **collaborative environment**?

How do we successfully incorporate **digital technology** throughout a project team and across the life cycle of a building?

How can any **single company** implement new strategies that will work with all its different building partners?

That is what "BuildUSA" is all about. You will find the answers to these questions—and many more--in this series of four white papers.

At the end of the white paper series, specific solutions will become available to the commercial market that will provide the standards, workflows, templates and processes required to implement an integrated collaborative environment.

What the industry describes as a Common Data Environment (CDE), or what we call the BuildUSA Collaborative Environment (BCE).

THE BCE-WHAT DO THE SOLUTIONS LOOK LIKE


THANK YOU!
Stay Tuned for –
White Paper 2 CDE, BIM & Big Data

APPENDIX

SOURCES

- Decoding Digital Transformation in Construction
- Seizing Opportunity in Today's Construction Technology Ecosystem
- The New Age of Engineering and Construction Technology
- Reinventing Construction Through a Productivity Revolution
- Imagining Construction's Digital Future
- Breaking the Mold: The Construction Players of the Future
- A Primer on Technology Adoption in Construction
- 3 Takeaways from BiLTna 2019 and What They Mean for the Future of the AEC Industry
- Shaping the Future of Construction: Future Scenarios and Implications for the Industry
- Shaping the Future of Construction: Insights to Redesign the Industry
- Shaping the Future of Construction: A Breakthrough in Mindset and Technology
- Digital Disruption in Engineering and Construction
- Digitalizing the Construction Industry
- 2019 Engineering and Construction Industry Outlook
- The Fourth Industrial Revolution is about to hit the construction industry. Here's how it can thrive
- Transience Market Data
- Workforce Data
- Market Data GDP of Building
- Industry Market Data
- More Market Data