BUILD USA

PRESENTS

THE NEAR FUTURE OF THE BUILDING INDUSTRY

The Fourth & Final White Paper of The Series

Sponsored By: SYNTECGROUP

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The near future of the building industry will be defined by the dominance of digital technology, the rise of "Optimized" building, and the emergence of new paradigms of corporate organization.

EXECUTIVE SUMMARY

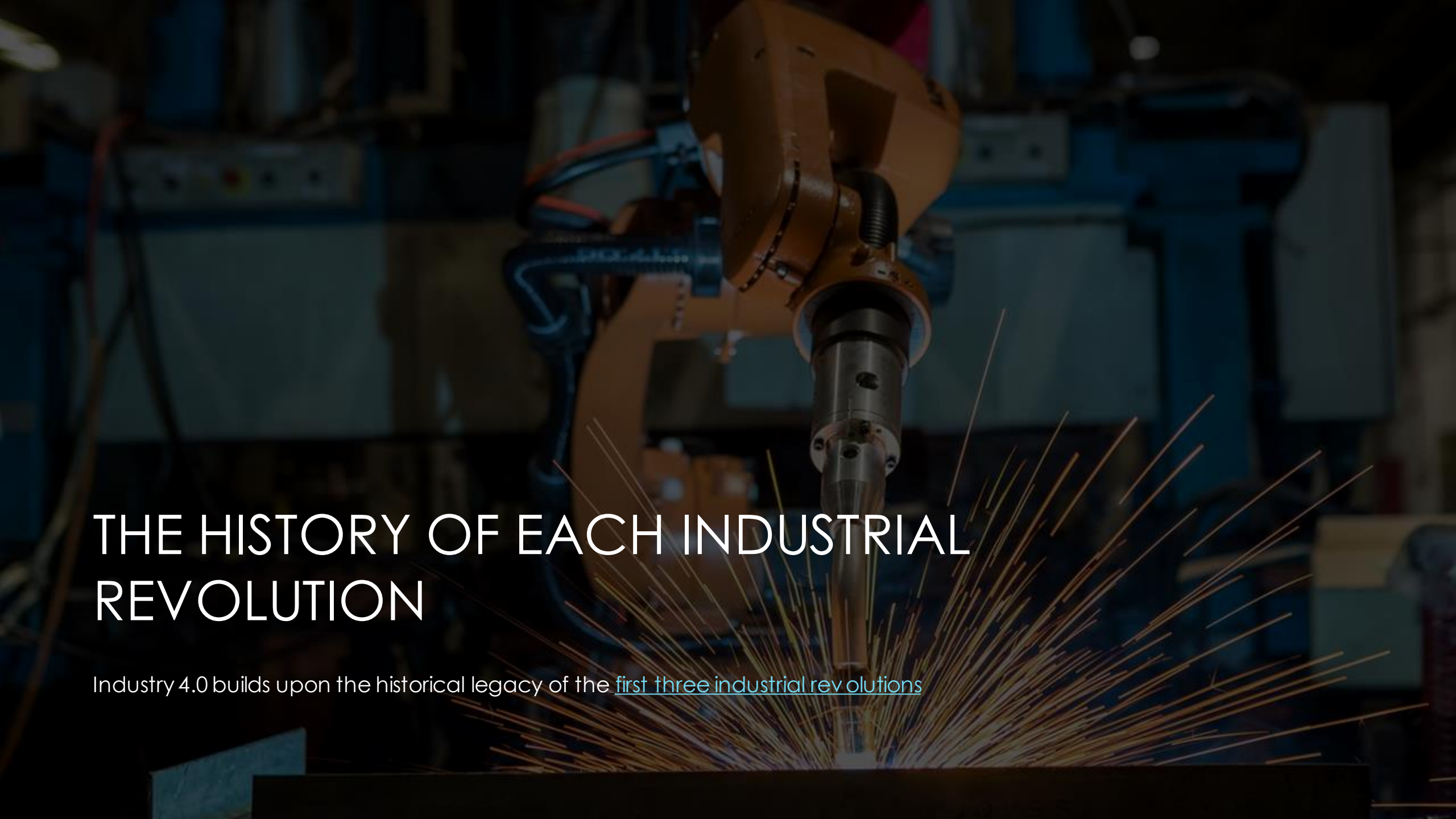
THE FOURTH INDUSTRIAL REVOLUTION

The evolution of digital technology has radically transformed almost every sector of the global economy, inaugurating a new era known as the **Fourth Industrial Revolution.**

THE FOURTH INDUSTRIAL REVOLUTION

Industry 4.0 centers around total connectivity, and features technologies that blur the boundaries between the physical, digital, and biological realms:

- Artificial intelligence (AI)
- The Internet of Things (IoT)
- Robotics
- Virtual reality
- Biotechnology
- Nanotechnology
- Autonomous vehicles
- 3-D printing, etc.



THE HISTORY OF EACH INDUSTRIAL REVOLUTION

Industry 4.0 builds upon the historical legacy of the first three industrial revolutions

The Big 4

Industry 1.0

1800's – Brought the greatest breakthrough for human productivity yet, with steam and water powered mechanisms allowing eight times the volume to be produced in the same amount of time, with less effort!

Industry 2.0

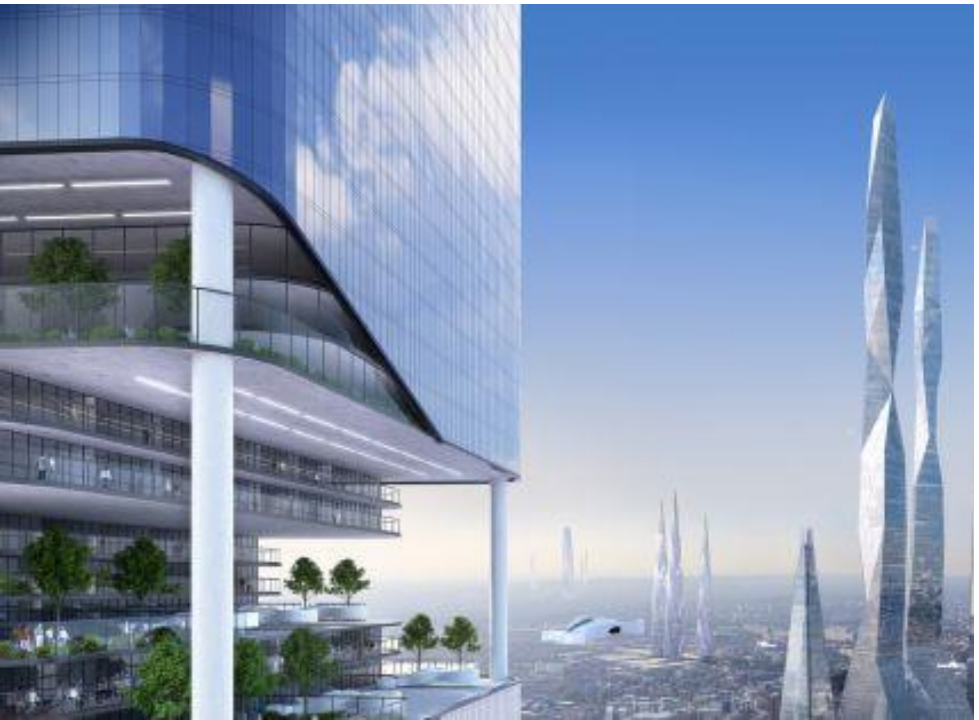
1900's – With the discovery of electricity new doors opened like never before. Assembly line production, automobiles, and electrical inventions changed the way the world would run forever.

Industry 3.0

1950's – In this technological and information age robots, personal computers and the internet entered our lives.

Industry 4.0

Today – 5G, IoT, artificial intelligence, autonomous vehicles, quantum computing, genetic engineering, drones, and advanced automation allowed things to evolve at an exponential rate and is disrupting industries with unprecedented speed.



INDUSTRY 4.0 IMPACTING THE BUILT WORLD

Industry 4.0 technologies carry the potential to make buildings smart, energy efficient, sustainable, and of enduring aesthetic and functional value.

- AI
- Big data analytics
- Collaborative digital environments
- Digital twins
- Drones
- Wearables
- Wireless sensors
- Augmented and virtual reality
- Automated and robotic equipment

WHAT DOES 4.0 HAVE IN STORE?

Changing how infrastructure, real estate, and other built assets are designed, constructed, operated and maintained.

HOW IS IT EFFICIENT?

The tremendous amount of data generated across the supply chain during the entire building life cycle, if properly organized and integrated, can be harnessed to drive profitability, cut costs, enhance safety, and reduce waste.

HOW IS IT EFFICIENT?

In addition, full-scale digitization could help the building industry generate an estimated **12-20% in annual cost savings, equal to between $1 trillion and $1.7 trillion.**

Given that the industry makes up 6% of **global GDP**, the economic and social upside is significant.

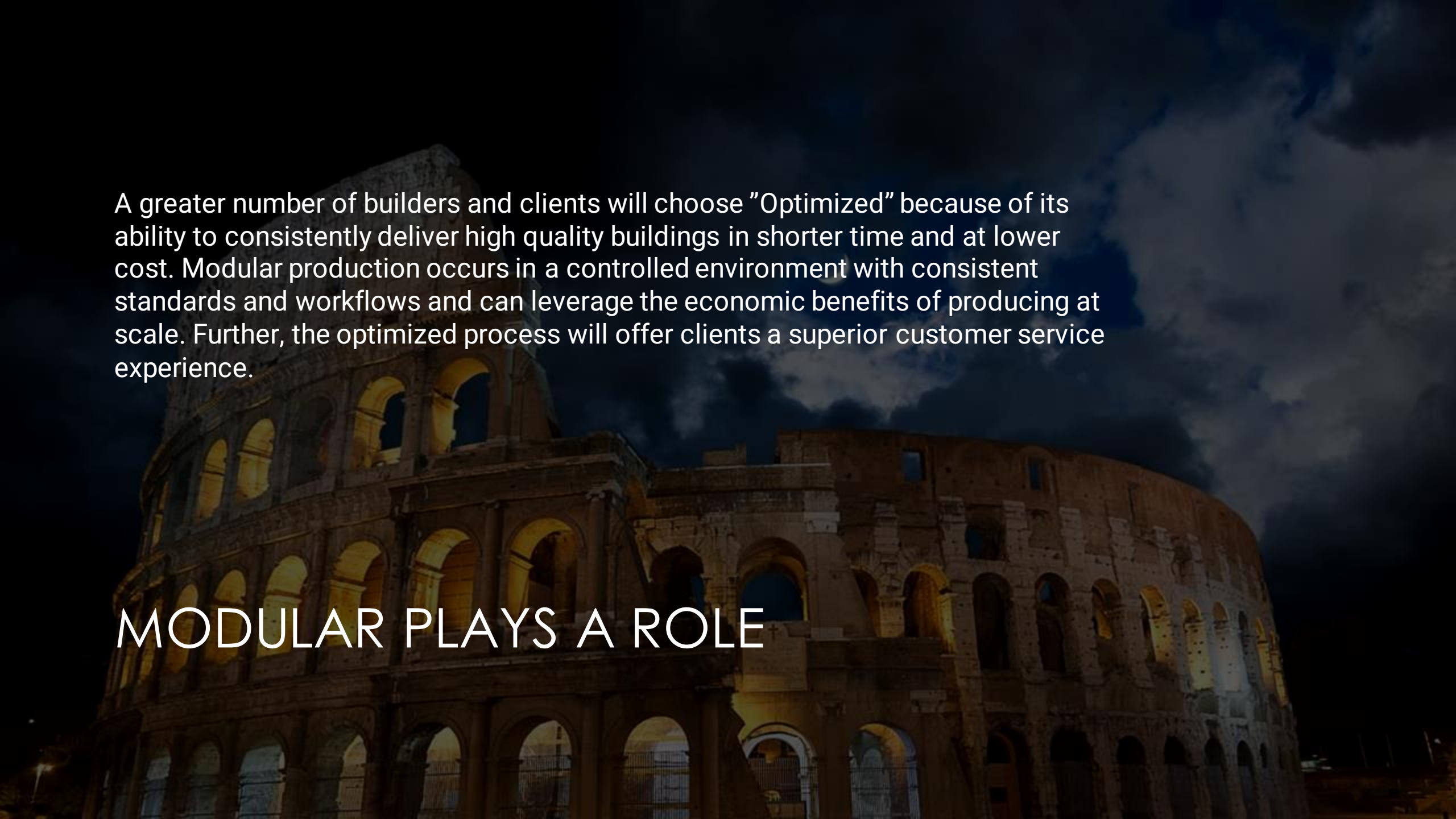
Companies that invest now in digital infrastructure and data analyzing capabilities will be poised for success in the new era.


BUILDING ORDERS

1. ***Boutique* Projects –** That offer high-end custom building solutions based on the unique preferences of an owner or client.
2. ***Iconic* Projects –** That develop large-scale structures that push the boundaries of current building technologies and techniques.
3. ***Optimized / "modular" Projects –*** That focus on buildings used throughout the built environment and do not require one-off customization for optimal performance.
4. ***Hybrid Projects –*** That combine features of #1, #2, and #3.

THE FOUR ORDERS

In the near future, **four building types** will emerge:

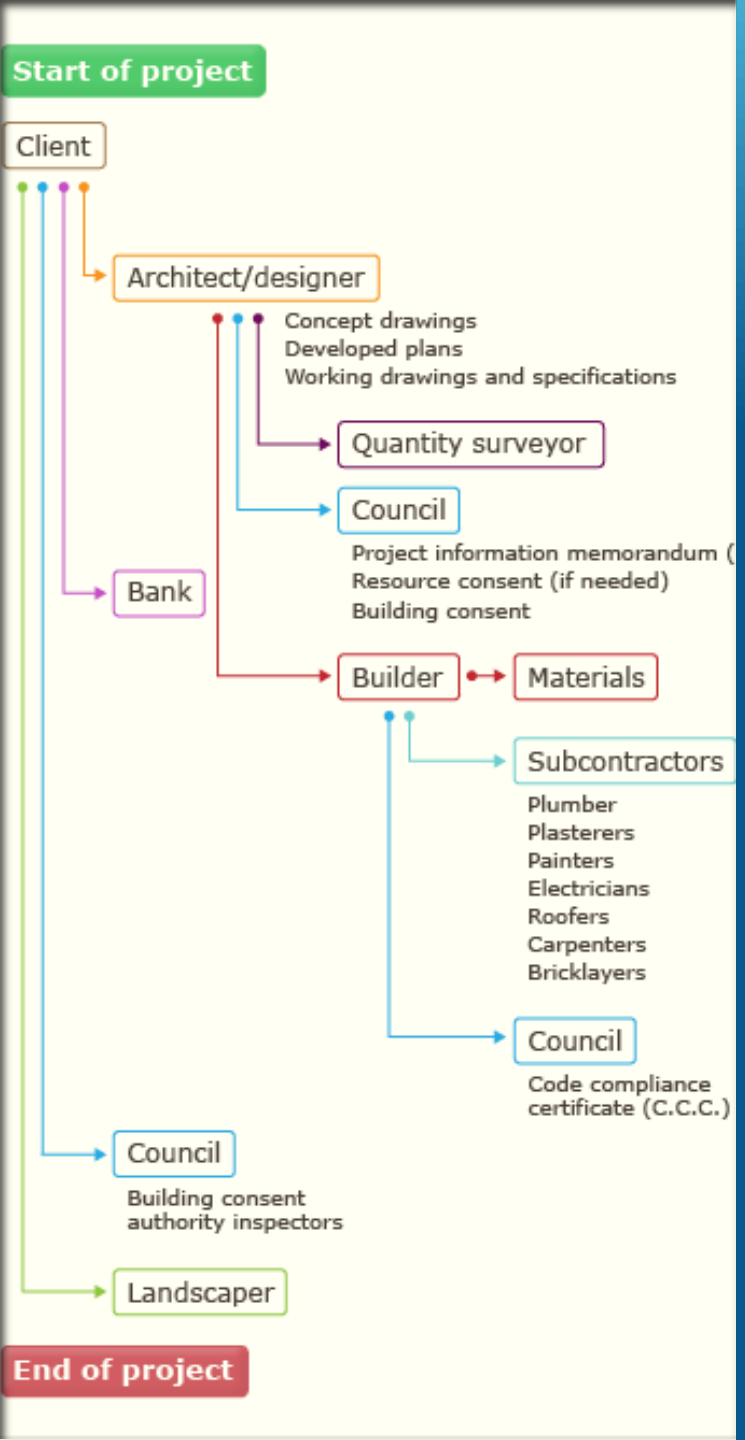


A greater number of builders and clients will choose ”Optimized” because of its ability to consistently deliver high quality buildings in shorter time and at lower cost. Modular production occurs in a controlled environment with consistent standards and workflows and can leverage the economic benefits of producing at scale. Further, the optimized process will offer clients a superior customer service experience.

MODULAR PLAYS A ROLE

BUILDING'S BIG PROBLEM

The building industry has endured this issue for far too long..



Today, building projects are typically custom, one-off endeavors. A client must deal with a variety of personnel:

- Architects
- Consultants
- Contractors
- Builders, and many more…

They are not always aligned with each other, and typically operate in their own silos.

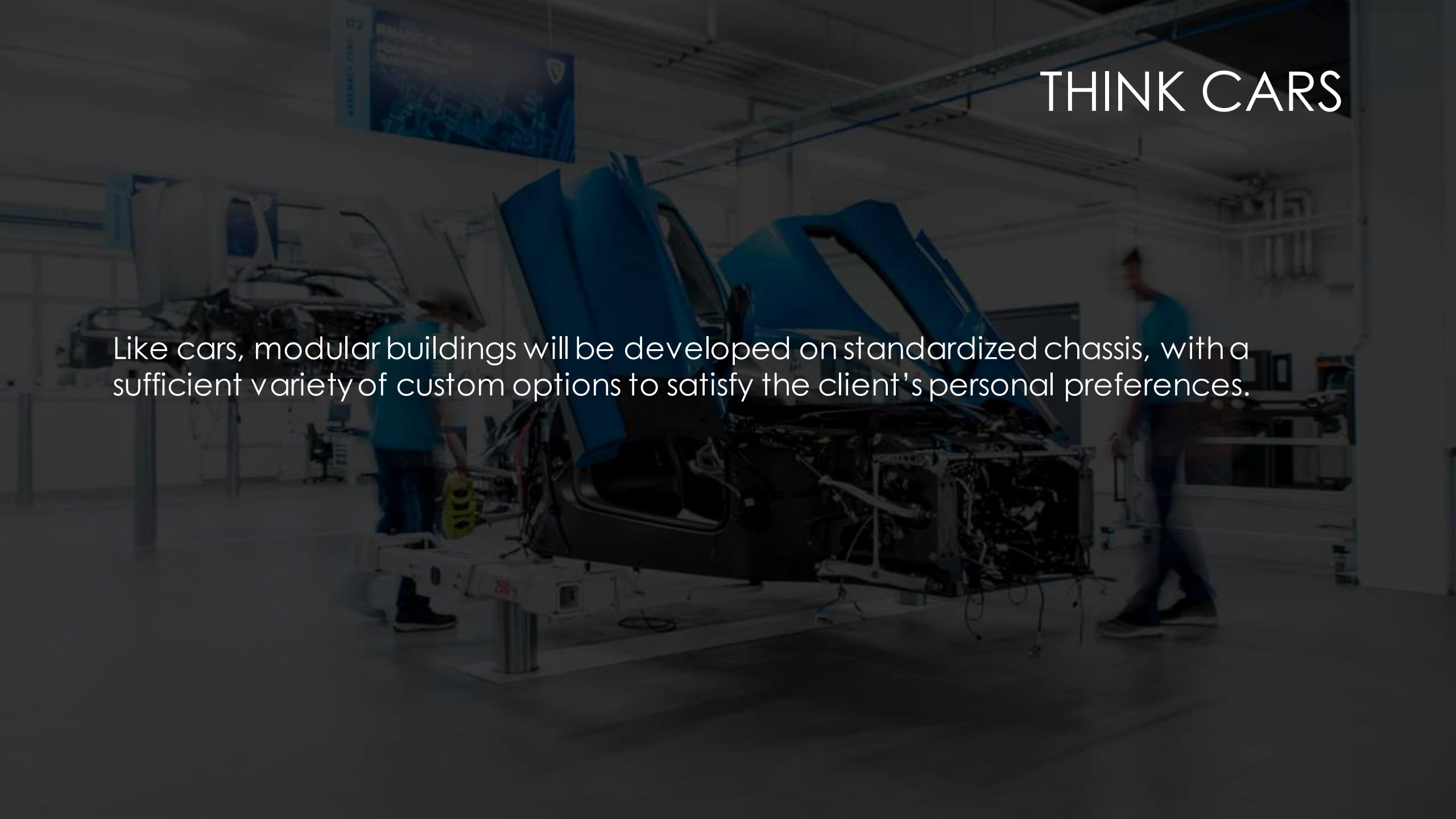
THE CORE PROBLEM

The Big Problem Results In

- It's difficult for the client to determine who to trust.
- Projects are often beset by **delays**, errors, and budget overruns.
- The experience for the client can be frustrating and disappointing.
- The final result is **uncertainty**.

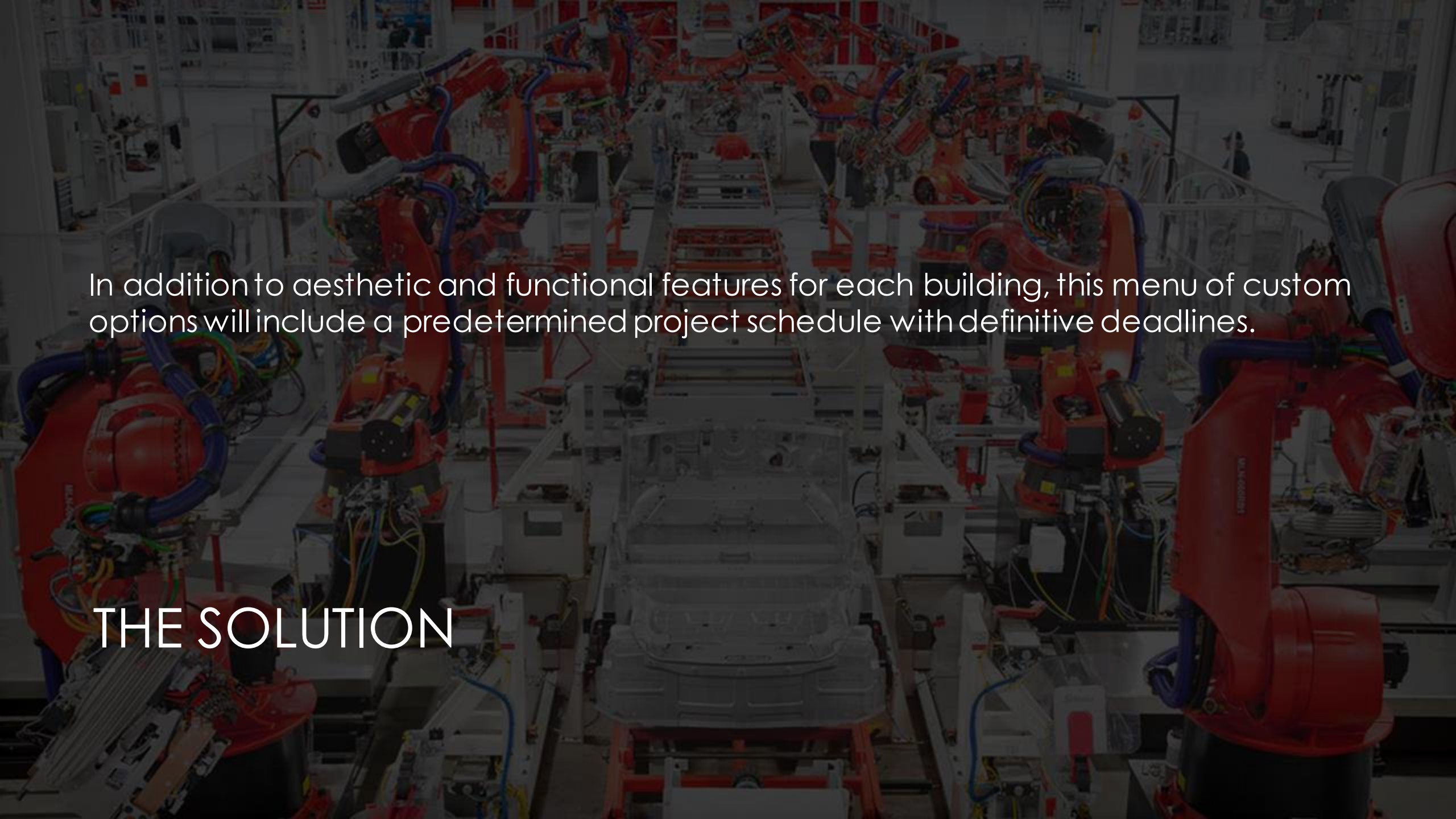
THE SOLUTION

Optimized building can eliminate many of these issues by dramatically reducing the uncontrolled variables in a building project.



THINK CARS

Like cars, modular buildings will be developed on standardized chassis, with a sufficient variety of custom options to satisfy the client's personal preferences.



In addition to aesthetic and functional features for each building, this menu of custom options will include a predetermined project schedule with definitive deadlines.

THE SOLUTION

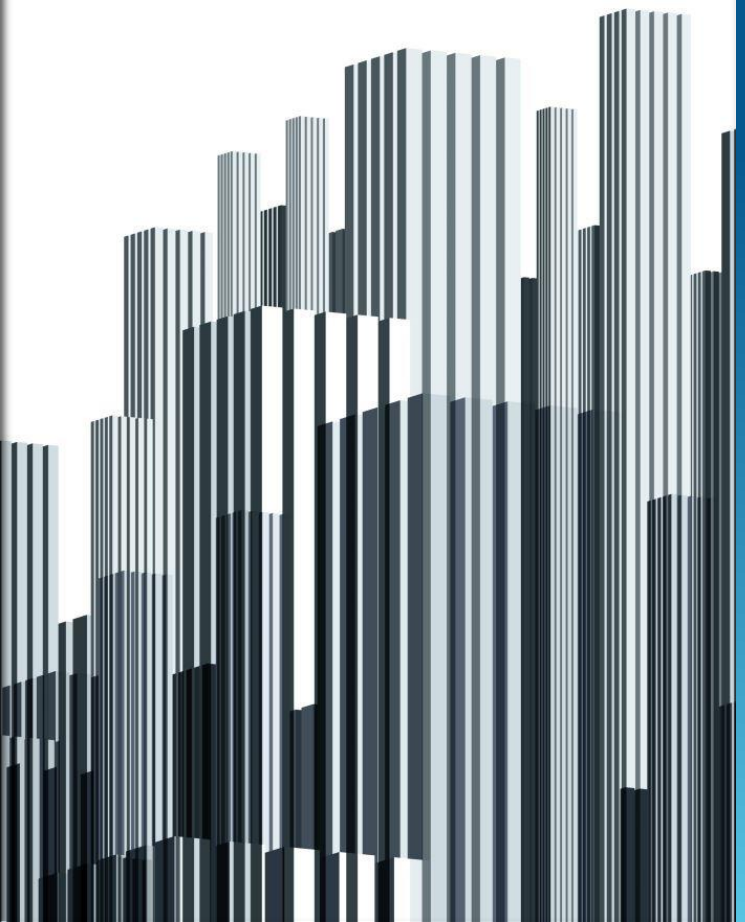
The AECM can walk the client through these options, and flexibly adjust to the specific conditions of the building site and the demands of the local community.

The customer experience will be interesting and rewarding, rather than the opposite.

The optimized process promises to revise the relationship between the user and the building industry—and for the better.

THE SOLUTION


BUILDING ORGANIZATIONS



Teams with substantial reach, resources, diversity of skill-sets, and digital competence will be better positioned to capitalize on the building projects, consulting engagements, and investment opportunities of the coming decade.

Forward-thinking industry players are developing 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.

THE ORGANIZATIONS

THE NEW LEADERS IN THE DIGITAL REVOLUTION

Two emergent organizational models will differentiate themselves in the near future:

- ***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.
  - The companies in CIPOs can maximize efficiency by working together on collaborative digital platforms that allow seamless data integration and information sharing within and between businesses.


BUILD USA

BACKGROUND

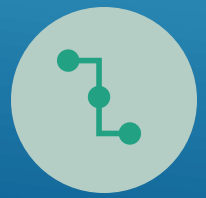
BuildUSA (BUSA) was developed to help industry stakeholders meet the demands of the future. The goal of BuildUSA is to position itself as a leading solution provider to the building industry, focused on integrated product development, project collaboration, and branded high-performance "Optimized" buildings.


THE PROTOTYPE INITIATIVE

The “Prototype Initiative (PI)” is a business strategy focused on developing a set of inter-disciplinary solutions for the building industry. It aims to create a branded process that provides “High Quality,” “High Performing” buildings in a “Shorter Period of Time” and at a “Lower Cost.”

PROTOTYPE INITIATIVE (PI)

Research



Process

Execution

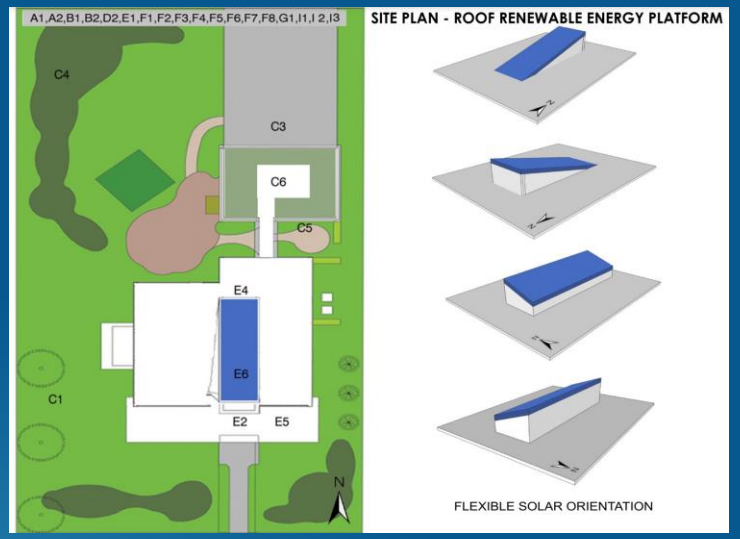
THE 3 CORE ASPECTS OF THE PI

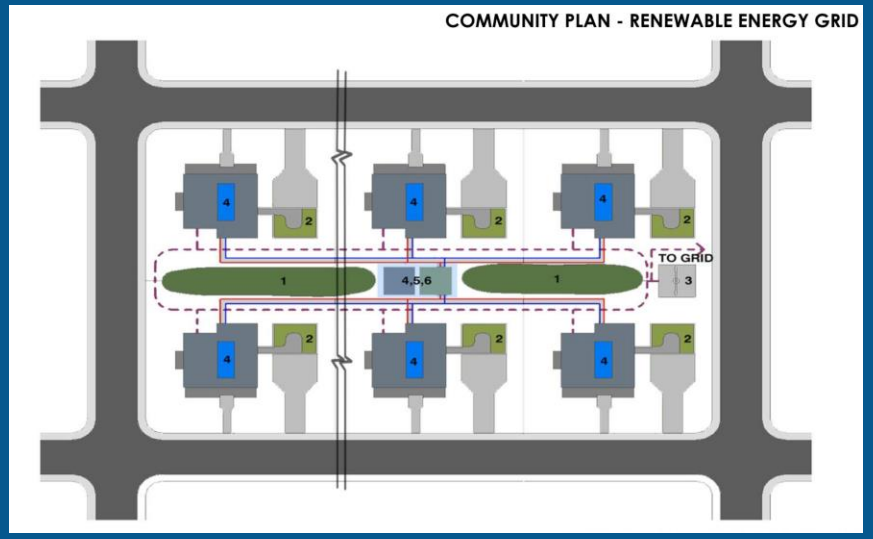
Research

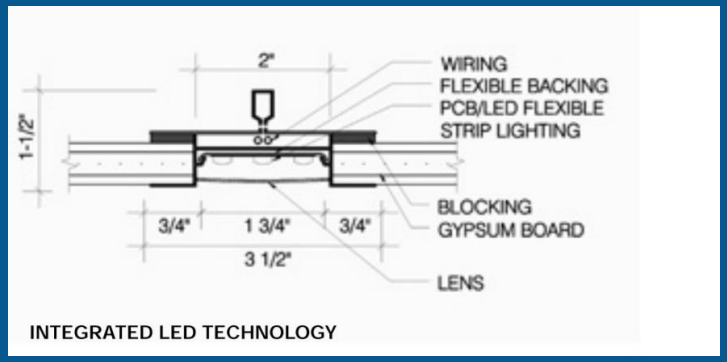
Research

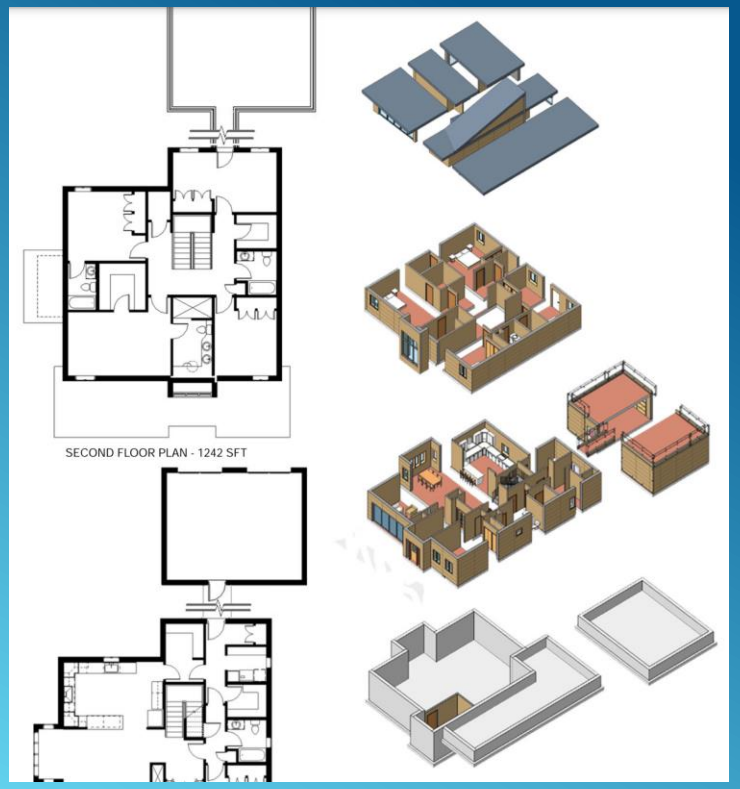
BUSA supports applied research into building products and systems that will promote sustainability, enhance occupant comfort, support wellness goals, and improve building performance.

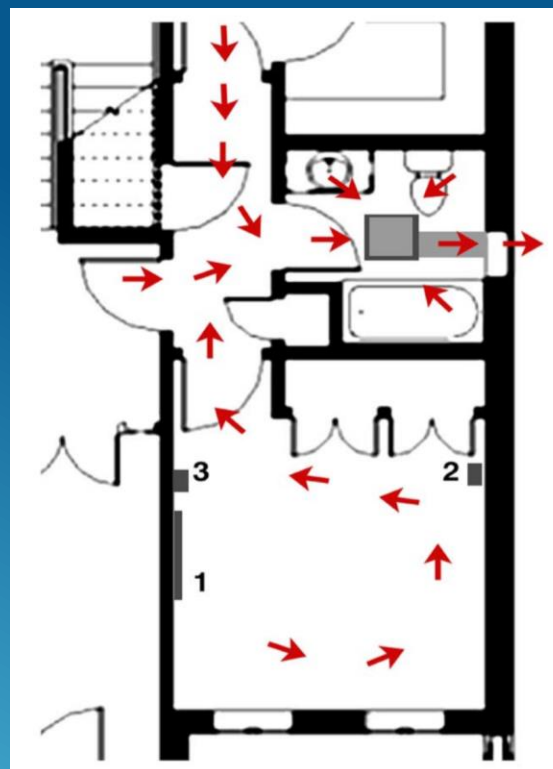
Active Research











FIRST FLOOR PLAN

SUSTAINABLE SYSTEMS & ASSEMBLIES

WELLNESS

1 - TELE - MEDICINE
2 - VITAL SIGN TOOLS / EQUIPMENT
3 - INFECTION CONTROL ACCESSORIES
↑ AIR CIRCULATION

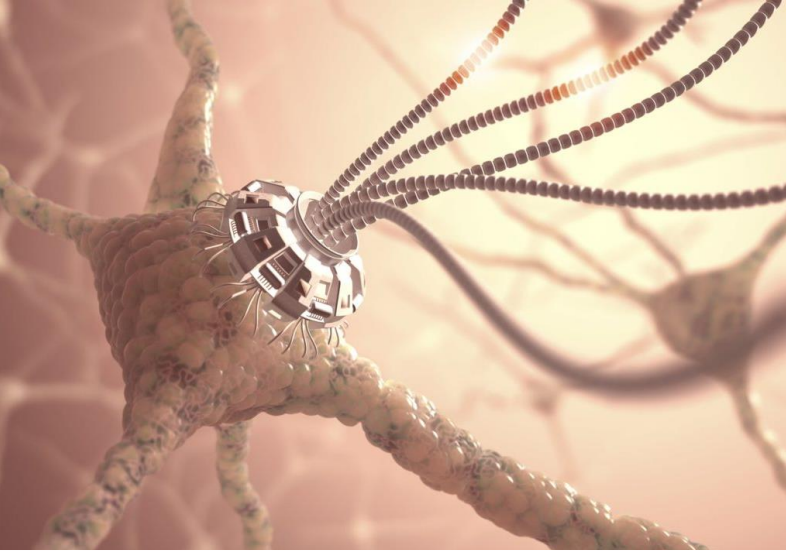
Today's healthcare requires the sick when most vulnerable to congregate in waiting rooms throughout the health system to obtain advice and service. The "Prototype" provides infection control and telemedicine to our homes at very modest incremental cost. Decreasing cross contamination, doctors visits and overall healthcare costs.

The bathroom exhaust includes two settings; Normal and a second setting which exhausts slightly more air than supplied to the zone.This simple design step transforms a guest bedroom suite into an infection control area reducing cross contamination between family members

Modular & Standardization

Modular products integrate the individual elements of building into prefabricated modules such as panels or rooms that can be assembled on site. The custom, one-off nature of building projects means that people build the same things slightly differently every single time.

This lack of standardization often leads to inconsistency, disagreement, lost time, and lost money. Construction Assembly Modules (CAMs) standardize the design and installation of complex units such as rooms, panels, and racks. CAMs also apply to integrated sensor and lighting products



In the near future, BUSA will be exploring product offerings in **3** developing fields:

1. **New building materials** evolving out of nanotechnology and accelerated building science research

2. **Energy distribution systems** such as smart grids and shared dc/ac power distribution

3. **Integrated building automation systems** that synthesize on-site sensor data and ongoing operations and maintenance.

SERVICES AND PRODUCTS

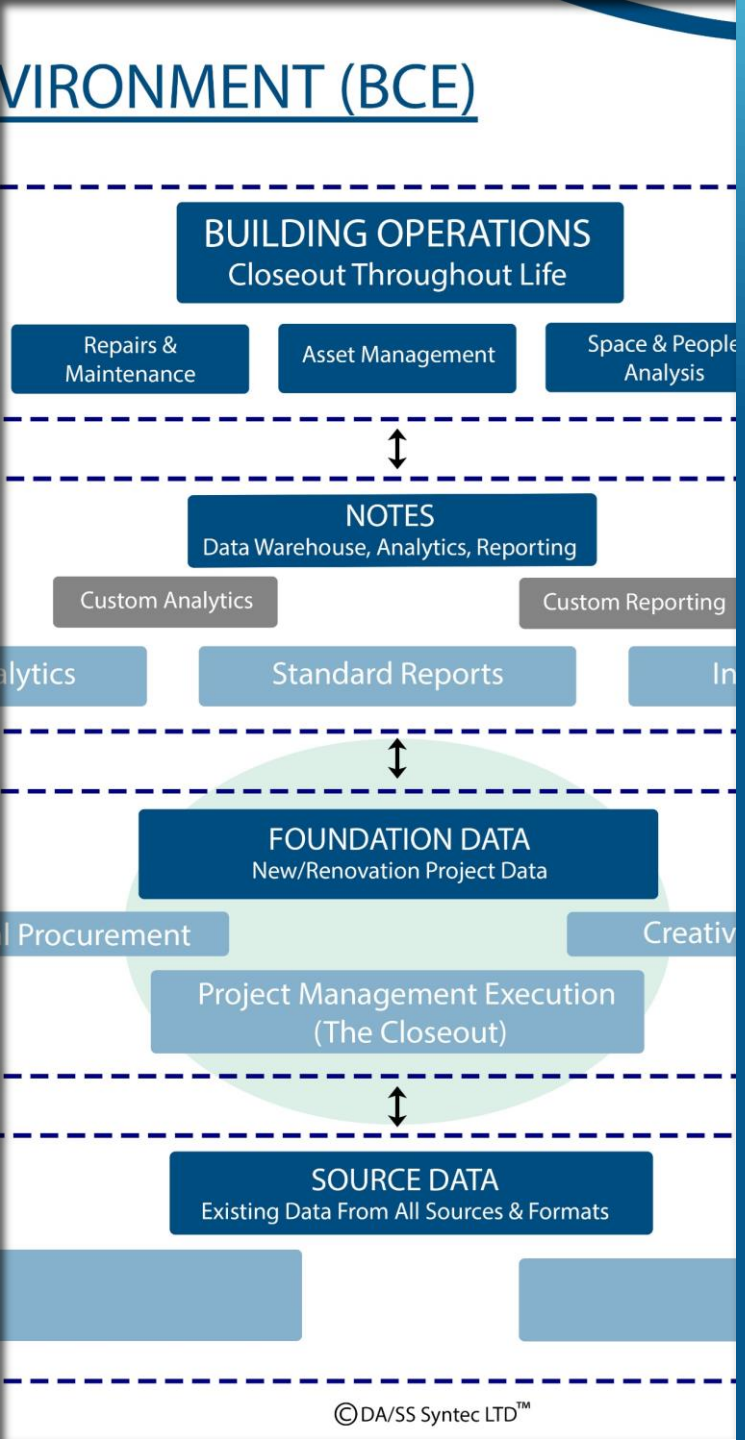
Process

Process

The Process category centers around the development of a cloud-based collaborative common data environment (CDE) called the BCE.

The BCE allows all project participants to access, share and add data within a collaborative environment organized around consistent standards, templates, and workflows.

The BCE functions as the single source of truth for a project, and significantly enhances project efficiency, security, quality and performance.



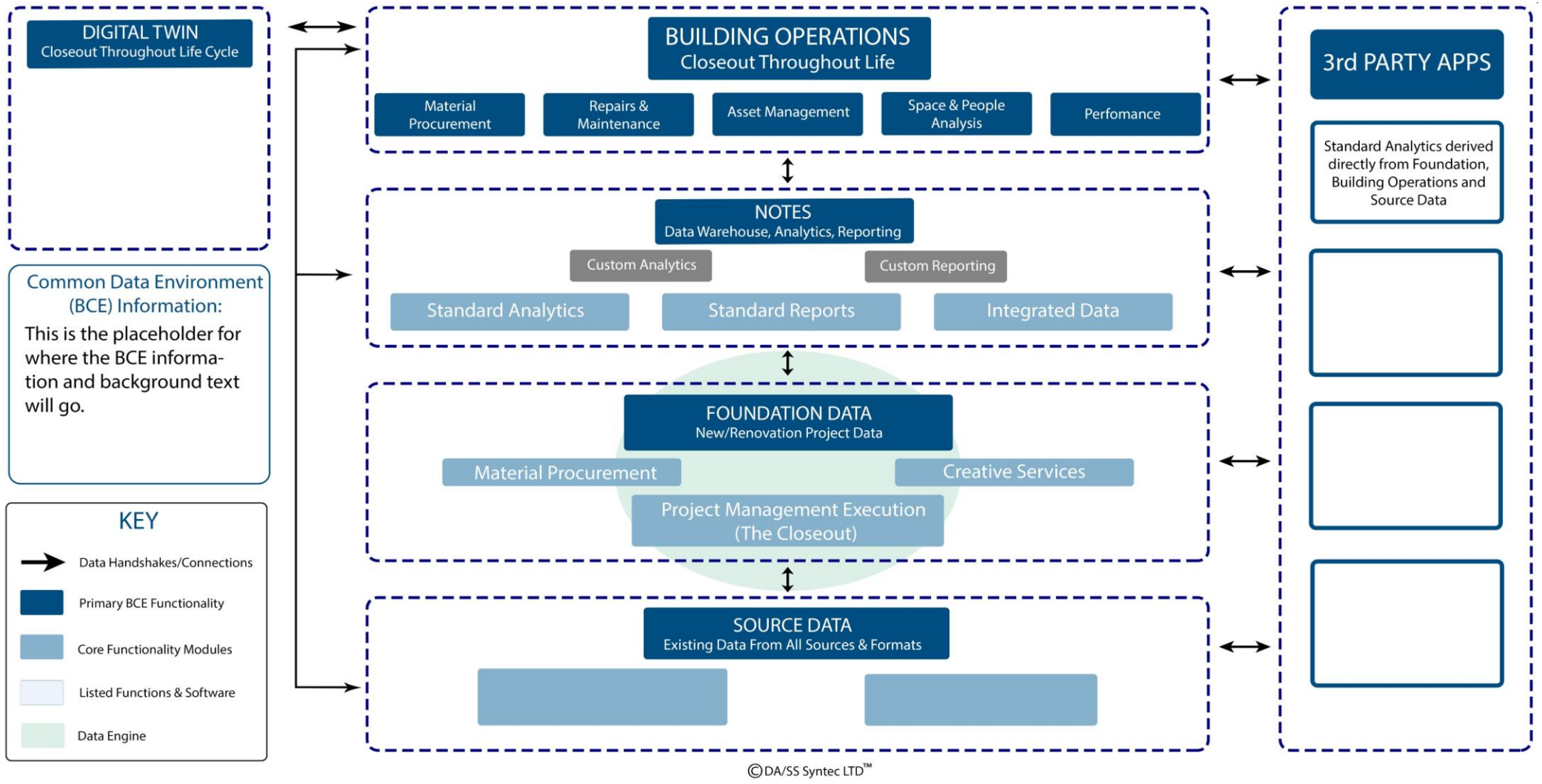
The BCE

It integrates multiple software applications into a central digital platform, including integrated capabilities across a spectrum of building life cycle functionality including;

- BIM,
- digital twin,
- data analytics,
- third party apps, and more.

In the BCE, the construction documentation typically developed by the A/E team will be expanded to include the material procurement chain, sub-contractor marketplace, construction management, asset management, and operations and maintenance.

BuildUSA Collaborative Environment (BCE)



Execution

Execution

The Execution category focuses on BuildUSA's efforts to develop a series of modular building types for the healthcare industry. As time goes on, more and more healthcare will be moved out of the critical care hospital box and into the ambulatory setting.

Modular solutions provide adaptable, high-performing healthcare workspaces that can be put into operation in much shorter timeframes and at much lower cost than traditional buildings.

There are 3 building types currently in development…

The First – Optimized Ambulatory Building

The first building set for market delivery is the Optimized Ambulatory Building.

The OAB provides same day health delivery services and offers optimized service suites that allow for standardized horizontal and vertical expansion to adjust to ongoing needs.

Second – The Spine Building

The Spine Building is a "Plug and Play" structure designed to offer Flexible Service Delivery, with the ability to adjust to community needs. Additionally, it offers on demand disaster response and surge capacity. Within hours, the building can provide services for an impacted community by quickly adapting to changing seasonal, special event, or disaster needs.

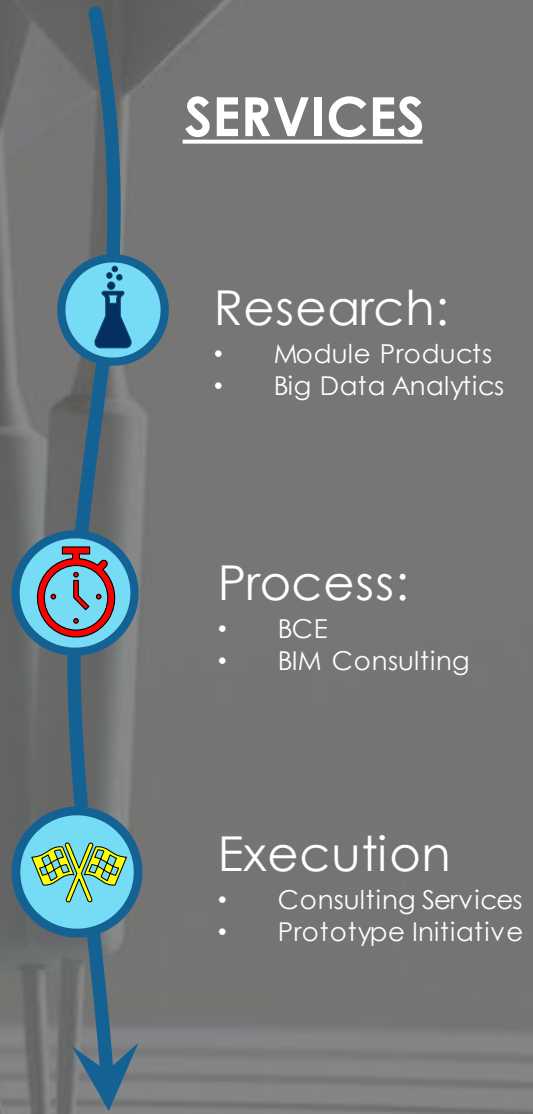
Third – The Health & Wellness House

The Health and Wellness Home provides a home infection control zone with negative pressure containment and Telemetry Healthcare Delivery. Its functional design will dramatically reduce unnecessary healthcare visits, cut costs and decrease cross contamination.

EXECUTION – TODAY

There are a variety of consulting services that BuildUSA will offer to support the implementation of these services and products.

Additionally, as the BCE accumulates more and more data powerful Reporting and Predictive Analytics will provide important insights to users.



CONCLUSION

MOVING INTO A DIGITAL WORLD

Today, the majority of companies in the building industry still cling to traditional methods of operation and ways of thinking. many still rely on two-dimensional, non-digital processes to manage their activities.

In order to flourish in the 21st century, the industry needs to **overcome its resistance** to change and embrace the digital age.

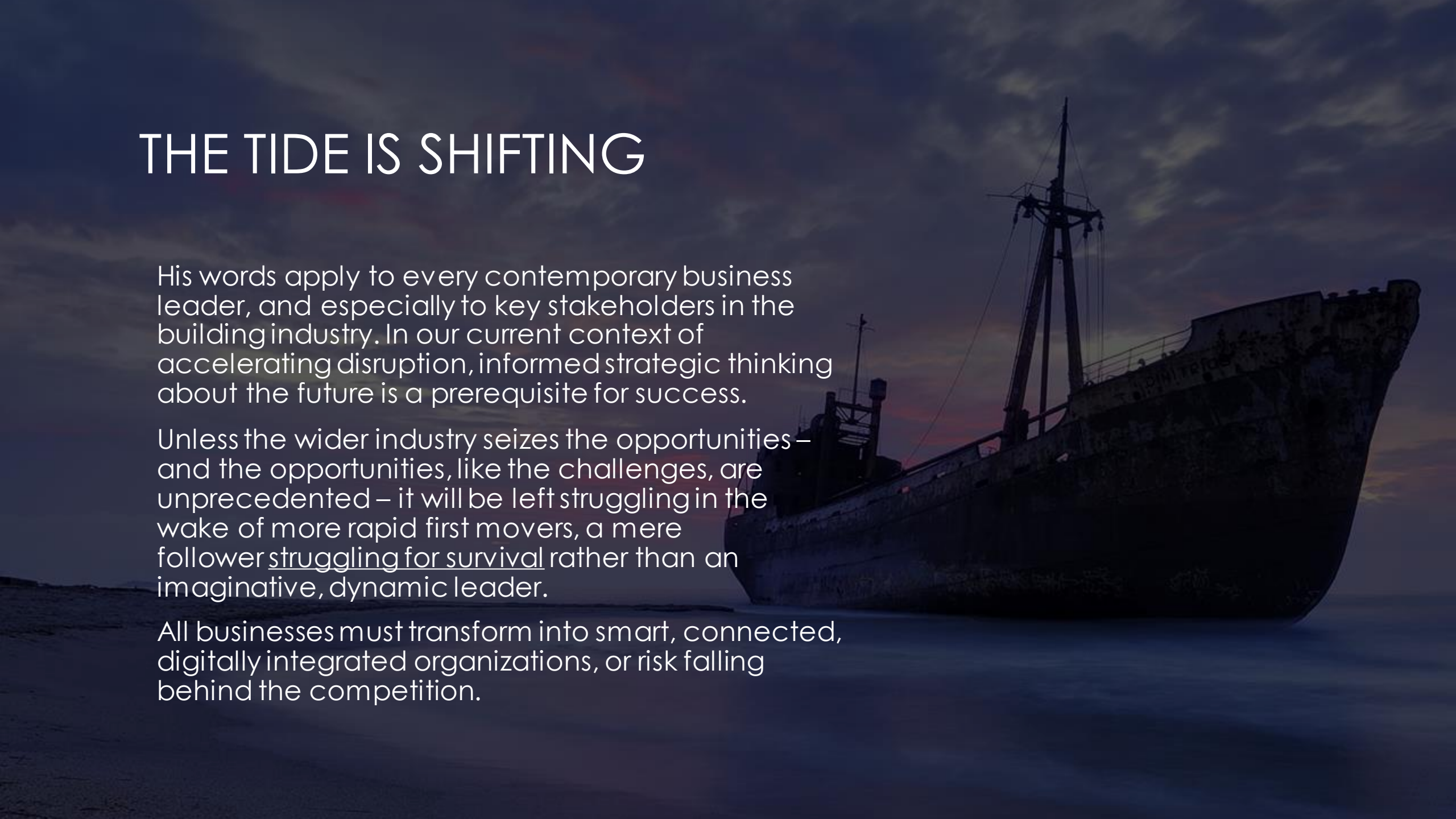
OPPORTUNITIES & CHALLENGES OF THE NEW ERA

"The changes are so profound that, from the perspective of human history, there has never been a time of greater promise or potential peril. My concern, however, is that decision-makers are too often caught in traditional, linear (and non-disruptive) thinking or too absorbed by immediate concerns to think strategically about the forces of disruption and innovation shaping our future."

Economist Klaus Schwab

The Fourth Industrial Revolution

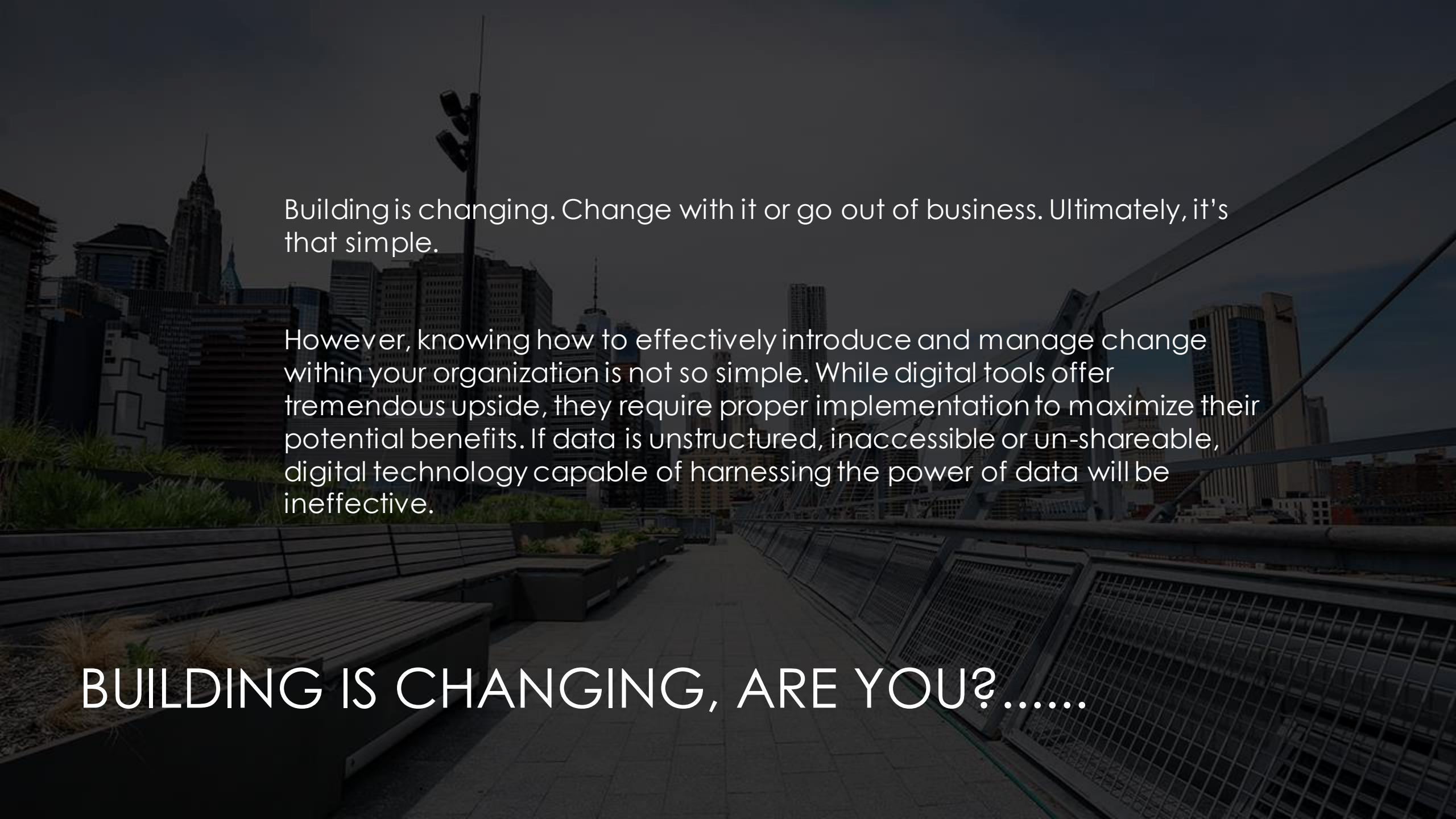
THE TIDE IS SHIFTING



His words apply to every contemporary business leader, and especially to key stakeholders in the building industry. In our current context of accelerating disruption, informed strategic thinking about the future is a prerequisite for success.

Unless the wider industry seizes the opportunities – and the opportunities, like the challenges, are unprecedented – it will be left struggling in the wake of more rapid first movers, a mere follower struggling for survival rather than an imaginative, dynamic leader.

All businesses must transform into smart, connected, digitally integrated organizations, or risk falling behind the competition.



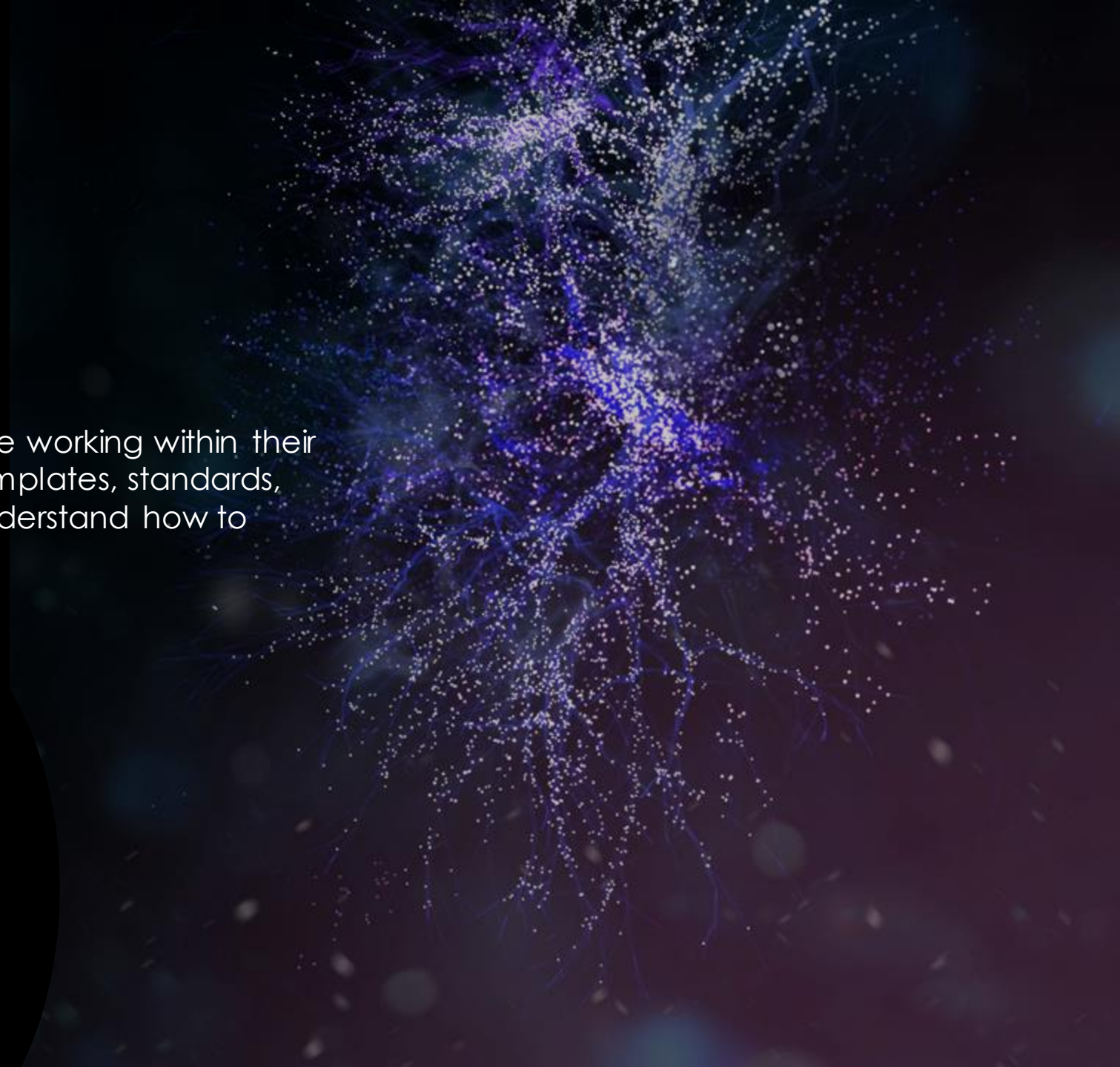
Building is changing. Change with it or go out of business. Ultimately, it's that simple.

However, knowing how to effectively introduce and manage change within your organization is not so simple. While digital tools offer tremendous upside, they require proper implementation to maximize their potential benefits. If data is unstructured, inaccessible or un-shareable, digital technology capable of harnessing the power of data will be ineffective.

BUILDING IS CHANGING, ARE YOU?.....

THE TRUTH

Currently, industry players are working within their own silos – with their own templates, standards, and workflows – and few understand how to leverage the power of data.



To harness the power of data analytics, AI, automation, and other Industry 4.0 technologies, it is necessary to optimize how data is structured and shared across the lifecycle of a building project.

This means developing consistent and agreed upon standards, templates, and workflows in a collaborative environment.

WHAT LIES AHEAD?

BuildUSA is a strategic vision of the future of building that also offers specific tools, processes, and support to make that future a reality.

We are here to help you make the best investment possible.

BUILDUSA - THE SOLUTION

Thank You !

SOURCES

- The Fourth Industrial Revolution
- The 4th Industrial Revolution Is Here - Are You Ready?
- The Fourth Industrial Revolution: what it means, how to respond
- The Fourth Industrial Revolution is about to hit the construction industry. Here's how it can thrive
- Shaping the Future of Construction: Future Scenarios and Implications for the Industry