SOCIAL CHANGE AND FORESIGHT

GROUNDING IN GROUNDBREAKING

CHANGE AGE

"BECAUSE THINGS ARE THE WAY THEY ARE, THINGS WILL **NOT STAY** THE WAY THEY ARE."

BERTOLT BRECHT

WHY IS SOCIAL CHANGE IMPORTANT TO FORESIGHT?

DISRUPTION IN CONSTRUCTION

EVALUATING **"THE FUTURE OF THE BUILT ENVIRONMENT"** REPORT THROUGH SOCIAL CHANGE THEORIES

XIE MAGGIE HILL | FORE 6331 - PROFESSOR JT MUDGE | DECEMBER 2, 2025

THIS ISSUE AT A GLANCE

DETAILS

APPROACH

EQUIVALENCY
This analysis is about 5,982 words, which equal to about 10 pages of single space times new roman font.

REQUIREMENTS
While this analysis includes extended explorations, refer to pages 05-13 for a direct glance of baseline rubric, also reference the contents table to the right.

CITATIONS FORMAT
Due to the choice of alternative formatting for narrative purpose, sources are cited using superscripts which are referenced in the bibliography section.

TEMPLATE FORMAT
This document format is an adaptation and modification inspired by "brands pack's news magazine" template.

BEHIND THE TITLE
The groundbreaking ceremony in projects of the built environment are often a tradition that celebrates the first day of a construction or building project. It is a key milestone to indicate a shift from the planning and design process to the building process.[2]

CONTENTS

The Future of the Built Environment

Prepared for: CII

By: The University of Houston Foresight Program

September 2019

DIRECTION

ASSIGNMENT OPTION
In fulfillment of option 01/A of this assignment I chose to evaluate an existing foresight report. For this assignment I will evaluate the Houston Foresight report "The Future of the Built Environment." This report presents four scenarios in which I apply three theories of change to evaluate, validate, critique, and extend the plausibility and foundation of those scenarios.[3]

ORIGINAL SELECTED FULL REPORT
Snapshots of relevant information from the original report are included. If the reviewer requires, the full original report can be found here for review.[1]

https://www.houstonforesight.org/wp-content/uploads/2019/06/Future-of-Built-Environment_Final.pdf

Cover Image: The image on the cover of this document depicts the Montparnasse Tower in Paris France. It is a 210-meter (689ft) structure with a controversial history as one of the tallest buildings in its skyline. Many say its contemporary style is out of place in Paris's historic cityscape. [a]

1

INTRODUCTION

TOWARDS A PRACTICE OF SPATIAL FUTURES

I wish I could say my passion for the built environment was immediate and sustained, however my journey into this 'space' has been much more variable and slow coming. I distinctly recall a time in junior high school where my home room teacher stated, "if you are trying to choose between being an architect or engineer, always choose engineering."

At the time, those words only confirmed the trajectory I thought I had set for myself to pursue math and science and then go into robotics and trades work. Up until that point, I had not thought deeply about the depth or possibility of interdisciplinary work, despite having a wide range of interests at the time. I could certainly say my past self would have been surprised to learn I ended up in the building industry and interior design, nonetheless.

However, I learned through my formal schooling and experience how vast and integrated this industry truly was. It spoke dearly to my dueling interests in technical and creative work and as I dove deeper, I started to see different facets of the field emerging and converging. With these possibilities I also saw many tensions, clashing dynamics, and opportunities.

When I started my career, I began at an architecture firm dedicated to workplace spaces and worked on honing my skills for my certification exams. Here, I was shocked to learn about some of the dysfunction between workflows of architects, consultants, and clients. Later, when I pivoted to the client side of work, doing design for an in-house corporate real estate team; I saw more areas of incongruence.

These areas of opportunity are what pushed me to aspire to foresight work dedicated to evaluating the built environment and its associated domains. I believe there is currently a true disconnect between professional practice, spatial futures, and the actual social readiness and reality of organizations.

MY THEORY OF EVALUATION

I chose to evaluate this report because it is a formal academic level report that offers a very clear structure allowing for application of key social change theories. The report also includes full detailing of methodology, a strong scenario set, and detailing of clear and tangible uncertainties related to the selected client. All these qualities work in tandem to provide a precise opportunity for evaluation.[1]

I believe understanding social change theory is crucial to foresight because it provides a way to assess potential feasibility of a scenario of the future by giving understanding to underlying structures, challenging assumptions, and providing context on why some futures hold with more success than others.

When I pivoted to client-side work, nested in a corporate real estate team, I had more chances to understand issues affecting the construction side of the industry. Along with growing automation, technological applications, and data integration[4] also crept labor shortages and rising material costs.[5] Additionally, when asked to try integrated delivery models, architects and contractors remained guarded. When the transaction and strategy teams pushed for spatial efficiency and team suites, end users balked at the idea of giving up hard earned corner and perimeter offices.

In my experience, it became clear that the future of the built environment is as much about the impacts of technological changes and organizational behavior as the social, cultural, psychological, and sociological phenomena, that are made less explicit in the Houston report.[6] Tönnies, Ogburn, and Rogers offer a basis to analyze these structures and assess the feasibility of the futures proposed in the report and whether those proposed futures might be premature, or as plausible as proposed.

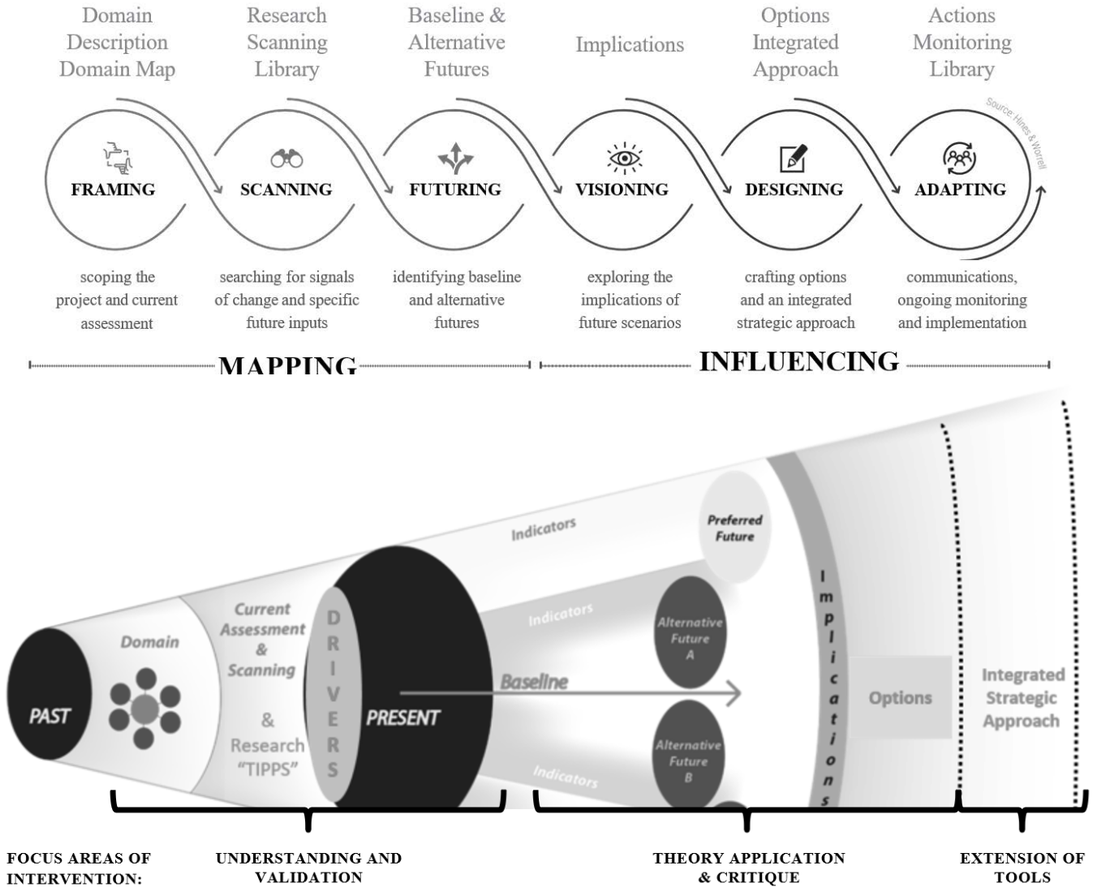


Figure 01: Areas of Analysis Intervention for this Assignment in Relation to the University of Houston's Framework Foresight and Value Chain.[e]

FOCUS AND SCOPE OF ANALYSIS

The framing and definition of the "built environment" has very extensive reaches. The EPA defines the built environment as, "the man-made or modified structures that provide people with living, working, and recreational spaces."[7] Under this definition, it is understandable that this industry would have many domains ranging from design, product, procurement, materials, construction, surveying, etc. The Houston report does well in defining these areas in relation to their original analysis.

For the purpose of this analysis and assignment, it is important to understand that the focus of this material lies more specifically in the research of the construction side of the industry as relevant to the client, the Construction Industry Institute. Though there are many areas of intervention, I specifically focus on the review of this report that moves from validation to applicable social change theories, analysis and critique, and finally potential extensions that integrate social change and foresight methods. (see Figure 01)

More specifically, I intend to show evidence that validates the research trends from 2019 to 2025. Then I prioritize the understanding of the four proposed scenarios related to Tönnies, Ogburn, and Rogers' theories of change. After these foundations, I drew on a handful of observations and recommendations for eventually extending the report in an adapted 2x2 matrix scoring exercise.

The original report also included a research portfolio. Due to constraints, these points were reviewed and referenced but not explicitly included as part of this evaluation.

While deeper evaluation could always be had, the overarching approach is intended to allow for analysis in the scope of the assignment that could be later expanded in a more appropriate setting.

2 THE FORESIGHT REPORT

BACKGROUND AND SUMMARY OF THE UNIVERSITY OF HOUSTON "FUTURE OF THE BUILT ENVIRONMENT" REPORT

SUMMARY NOTES

"The Future of the Built Environment" report, is a robust documentation of the Framework Foresight method applied to identify disruptive strategic issues for the construction industry.[1] A thorough review of this report was conducted for this assignment. The details on this page are outlined and summarized as a demonstration of the overall understanding of report findings.

Due to the extent of this report, information in this section is condensed in bullets, lists, brief descriptions, and tables. While important areas might lean more to paragraphs, brevity in this section was prioritized for later analysis to be the areas where more explanation is provided. This is intended for the ease of any reviewers' comprehension at a quick glance for contextualizing the original report being evaluated.

BACKGROUND

This report was produced by the University of Houston Foresight program for the Construction Industry Institute (CII). CII is a research and development group for capital projects based at the University of Texas at Austin. They work to bring together experts from academia and industry from around the globe to build innovative tools and solutions through an academic lens. Its impact spans more than four decades consisting of dedicated leaders, firms, and service providers who all align to improve safety, technology, cost, and schedule across construction projects.[8]

The Houston Foresight team was asked to use scenario planning to explore "the future of the built environment." This effort was intended to provide the CII with information to evaluate potential disruptions in the construction industry for possible use in proactive interventions or strategizing.[1]

PRINCIPAL COMPONENTS

01 | DOMAIN MAPPING
For this report seven primary domain categories were defined: planning, designing, staffing, procurement, customers, constructing, and operating. (p.13)[1] These domains provided a framework for horizon scanning related to STEEP+ or social, technological, economic, environmental, and political context influencing the built environment. (p.14)[1]

02 | HORIZON SCANNING AND TRENDS
Through rigorous scanning effort 243 scan hits were collected in a scan library, creating a well-rounded report of strong and weak signals. This resulted in an output of 76 distinct trends, or statements about a change and the direction it is moving. (p.14-18)[1]

03 | DRIVERS
The results from the scanning and trends were synthesized into 16 key drivers related to the three dimensions of the futures triangle. (see right page, p.19-21)[1]

04 | INTERVIEWS AND KNOWLEDGE BASE
Twenty-three interviews and CII's knowledge base also informed research efforts to define drivers and uncertainties. (p.22-24)[1]

05 | UNCERTAINTIES AND MODELS
This report used the 2x2 uncertainty scenario planning approach which frames the two most important and uncertain elements to be evaluated. All prior efforts were key in defining uncertainty scales. (p.24-27)[1]

07 | WORKSHOP AND PORTFOLIO
Following the definition of the four scenarios, a first order implications workshop set the stage for a research portfolio that could then be used to develop a strategic response for during the second implications workshop. (p.56-72)[1]

FOCAL QUESTION
What are the potentially big disruptions ahead in the next ten years for the built environment? (p.12)[1]

GEOGRAPHIC FOCUS
North America was the focus with some global examples helping inform what might be ahead (p.13)[1]

NOTEWORTHY TRENDS
Specific to the construction industry, some key trends were: labor and staffing challenges, more technology applications, prefab growing, more automation, augmentation, data integration (p.17)[1]

DRIVERS
Researchers identified 16 key drivers related to the dimensions of the Futures Triangle for this topic. (p.19-21)[1]

PULLS OF THE FUTURE
- Automation and Labor
- Prefab Approach
- Shifting Sense of Place
- Smartness
- Net Plus
- 3D Printing

PUSH FROM THE PRESENT
- Integration with Surroundings
- Mixed-use Development
- Off-the-grid
- Personalization
- Sharing
- Voluntary Simplicity

WEIGHTS FROM THE PAST
- Impacts of Climate Change
- More Varied, Regulation
- Transparency and Integration
- Trade Power

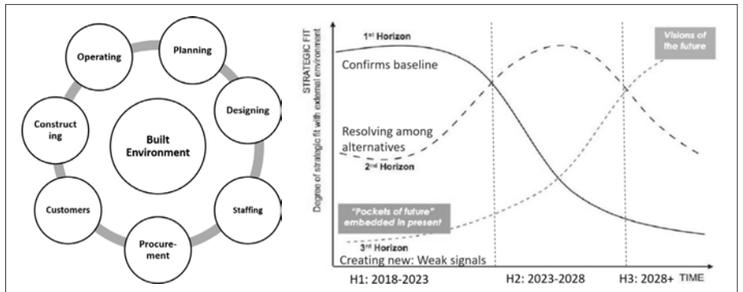


Figure 02: Report Domain Map (p.13)[1] | Figure 03: Three Horizons Graphic Representation (p.15)[1]

AT A GLANCE
Author: University of Houston Foresight Program
Project Team: Andy Hines led the research, assisted by alum Maria Romero and four graduate students. (Project Team Details Appended p.73)[1]
Client: Construction Industry Institute
Purpose: Its primary purpose was to identify disruptive strategic issues for the built environment and potential scenarios for the next 9-10 years from the original reporting date.
Year and Time Horizon: This report was generated in 2019 with scenarios for the built environment based in 2028. Thus, this reflects a 9–10-year time horizon most consistent with H2.

06 | FOUR SCENARIOS OF THE FUTURE OF THE BUILT ENVIRONMENT
Summary definitions are below, full report provides a detailed breakdown (p.27-55)[1]

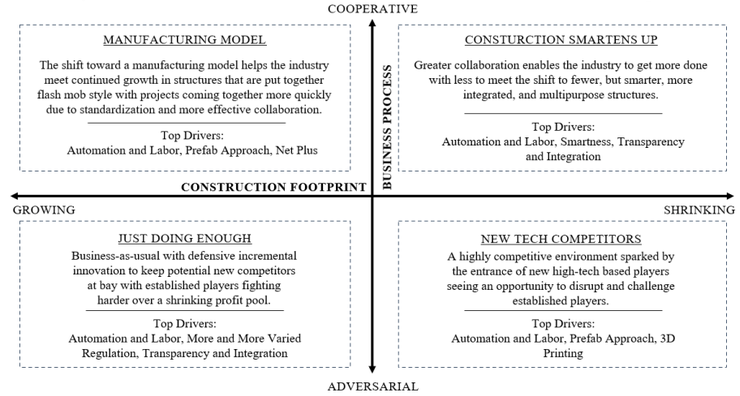


Figure 04: Condensed Summary of Four Scenario Matrix with Top Drivers (p.28)[1]

INITIAL THOUGHTS

After initial review, the report reveals several opportunities for validation, analysis, and expansion that are addressed in greater depth in the following sections. First, a more focused description of the "built environment," especially given the report's emphasis on construction, would help with scoping and expectations. Second, since enough time has passed since the report's release to compare its forecasts with actual developments, many trends have since been confirmed while new and unexpected ones have emerged. This gives opportunity for closer analysis. In terms of methods, the use of a 2×2 matrix brings clear advantages but also limitations that warrant reflection in this context. Finally, the drivers and scenarios appear heavily oriented around technology and organizational behavior, while labor and workforce dynamics are framed largely in economic terms. Incorporating social change theories could enrich the analysis and broaden the understanding of these influences.

3 THE THEORIES

FERDINAND TÖNNIES
GEMEINSCHAFT/GESELLSCHAFT

WILLIAM OGBURN
CULTURAL LAG

EVERETT ROGERS
DIFFUSION OF INNOVATIONS

APPLICATION

Ferdinand Tönnies, William Ogburn, and Everett Rogers all provide foundational theories which demonstrate the necessity of social change theory in foresight work. Their respective theories, Gemeinschaft/Gesellschaft, Cultural Lag, and Diffusion of Innovations all contextualize an important basis for analysis.

TÖNNIES

In *Community and Society*, Ferdinand Tönnies distinguishes between two fundamental types of social organization: Gemeinschaft (community) and Gesellschaft (society).[9] He states, "there is a contrast between a social order which--being based upon consensus of wills--rests on harmony and is developed and ennobled by folkways...and an order which--being based upon a union of rational wills--rests on convention and agreement."(p.145)[10] By his definition, Gemeinschaft is thus characterized by natural and enduring social bonds rooted in kinship, tradition, and shared moral values, and Gesellschaft reflects instrumental, goal-oriented relationships based on contracts, law, and political authority.

Essentially, Gemeinschaft describes order maintained through customs and consensus, while Gesellschaft describes typical organization of modern cities and industrial societies.[11] From this, Tönnies primarily argues that human history has progressively shifted from Gemeinschaft to Gesellschaft, which produces efficiency and progress but also social fragmentation and moral decline.[12]

For foresight, his framework is essential for understanding how social cohesion, trust, and cultural norms might affect the direction of change. Gemeinschaft systems are rooted in high-trust, relationship-based structures while Gesellschaft systems are more individualistic and competitive, each requiring different conditions for social change.[9] In relation to the built environment, professional industry relations (between architects, engineers, contractors, etc.) are typically fragmented, adversarial, low-trust, and highly contractual. This makes Tönnies's theory an essential lens for assessing scenarios that presume industry-wide collaboration or cultural transformation.

OGBURN

William Ogburn's theory of cultural lag is also essential when evaluating change in relation to culture. While some critiques exist on his deterministic view of technology, his theory widely describes the delay between material culture and social culture.[13] He directly states, "technology moves forward and the social institution lags behind in varying degrees." (p. 133)[13] In this example, technology is correlated to social institution. When technology changes to a more significant degree than previously accounted for, a period is needed for social and cultural adjustment.

He further expands on this theory by describing four stages of cultural lag. When technology changes, industry is usually the first sector to adjust, followed by government structures which institute regulations, and then finally social-philosophical minds change.[14] Simply put, the cultural lag phenomenon explains why tension arises with change. Gaps in material and social culture cause conflict and confusion until a certain level of alignment is achieved and accounted for.[15]

Since much of foresight deals with the dynamic between material culture and social culture, Ogburn's theory helps explain why 'possibilities' do not always equate to readiness.

If institutions, laws, norms, and skills change at a slower pace than technology, futures that predict any rapid or clean adoption of technological advancements are likely to fail. Because the built environment report emphasizes trends in advanced manufacturing, artificial intelligence, and other forms of smart construction, understanding cultural lag is necessary for scrutinizing the pace of change in such industry.

ROGERS

Finally, Everett Rogers's diffusion of innovations theory provides insight into how ideas spread unevenly across social systems.[16] He describes that, "not all individuals in society adopt an innovation at the same time. Rather, they adopt in a time sequence, and they may be classified into adopter categories on the basis of when they first begin using a new idea."(p.01)[17] In this framework, trialability, relative advantage, complexity, compatibility, and observability are all attributes that help identify different adopter categories.[17]

Rogers then distinguishes the five adopter categories of innovators, early adopters, early majority, late majority, and laggards and the S-curve pattern that characterizes most adoption processes. His theory highlights the importance of social mechanisms (communication channels, social networks, opinion leaders, cultural norms) in determining the speed and diffusion of new practices.[18]

While Rogers' work is central to fields like marketing, his theory is also significant to foresight by relating drivers that accelerate or inhibit change to the adoption curves of key stakeholder groups. With respect to the built environment, this theory helps to extend the evaluation by considering the industry does not operate on a unified adopter system.

TOGETHER

Tönnies, Ogburn, and Rogers connect the underlying structures, frictions, and patterns that shape social change to foresight. While the future of the built environment report presents coherent scenarios, these theories reveal the social preconditions, lags, and adoption dynamics that ultimately determine their plausibility and suggest when scenarios hold to interrogation, and where they can be improved.

FERDINAND TÖNNIES

CORE THEORY
Gemeinschaft and Gesellschaft

KEY CONCEPT
Gemeinschaft = kinship, tradition, shared values, social cohesion
Gesellschaft = rational, contractual, impersonal, modern institutions

WHAT THE THEORY EXPLAINS
How social cohesion transforms from community-based bonds to efficiency-driven, impersonal structures, and why modern societies experience fragmentation and declining interpersonal trust

APPLICATION TO FORESIGHT
Helps assess how trust, social cohesion, and cultural norms influence the direction and speed of change

APPLICATION TO REPORT
The industry largely operates as a low-trust, contractual Gesellschaft system

WILLIAM OGBURN

CORE THEORY
Cultural Lag

KEY CONCEPT
Technology (material culture) changes faster than social institutions and norms (non-material culture)

WHAT THE THEORY EXPLAINS
How misalignment between social and material culture generates conflict and confusion

APPLICATION TO FORESIGHT
Reveals why technological "possibility" does not equal adoption or readiness

APPLICATION TO REPORT
Helps evaluate realism in timelines for technological transformation across the sector

EVERETT ROGERS

CORE THEORY
Diffusion of Innovations

KEY CONCEPT
Adopter categories: innovators, early adopters, early majority, late majority, laggards
Diffusion follows an S-curve pattern

WHAT THE THEORY EXPLAINS
Why innovations spread unevenly across populations and systems and how communication networks, norms, and social influence shape adoption rates

APPLICATION TO FORESIGHT
Clarifies drivers and barriers that accelerate or slow innovation adoption

APPLICATION TO REPORT
Helps analyze fragmented adoption patterns across architects, contractors, engineers, regulators, and clients

Figure 05: Summary of Theories and Why they are Relevant to Foresight and General Report Analysis (ref. digital tools)

4 THE ANALYSIS

VALIDATION, CRITIQUE, RECOMMENDATIONS, AND SYNTHESIS

VALIDATING TRENDS

Looking at this report in 2025, only 3 years shy of the 2028-H2 projection, provides an opportunity to compare scans and headlines. I was able to ask, what has actually happened since the suggested time horizon? What trends are validated, and which are new, emerging, or unexpected?

LABOR AND STAFFING CHALLENGES
2019: " Aging Demographics: A Threat To The Economy..."[19]
2025: " Persistent Workforce Shortages and Hiring Challenges"[20]

MORE TECHNOLOGY APPLICATIONS
2019: " Aconex Construction Management from Oracle"[21]
2025: "Digital Builder Ep. 19: 3 Takeaways on Augmented Reality (AR) and Virtual Reality (VR) in Construction"[22]

GROWING PREFAB
2019: " Modular Construction Will Build New Momentum in 2018"[23]
2025: " The Rise of Modular and Prefabricated Construction..."[24]

MORE AUTOMATION
2019: " This new robot can tie rebar on bridges..."[25]
2025: " Market to Reach $659.7 Bil...Fueled by Demolition Robots..."[26]

AUGMENTATION
2019: " 22 Exoskeletons For Work and Industry Into 6 Categories"[27]
2025: " German Bionic has introduced the Apogee Ultra"[28]

DATA INTEGRATION
2019: " Massive growth of IoT in manufacturing and industries"[29]
2025: " 10 keys to understanding construction data analytics"[30]

Comparing high-level scanning from 2019 to 2025, one can see the main trends from the original report remain relevant to the current state of the built environment. Other speculated trends more specific for 2025 might be sustainability, upskilling, and alternative labor strategies. [31]

This validation exercise also supports the original reports' suggestion to maintain an ongoing scanning practice. (p.71)[1]

VALIDATING METHODS

The 2x2 method specifically frames the two most important and uncertain elements against each other. Since these results create possible future outcomes, that then allow the organization to anticipate the next best course of action, it is also important to consider the pros and cons of this method.

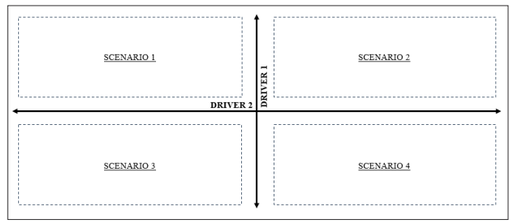


Figure 06: Example of Empty 2x2 Matrix

PROS [32]
- Clear audit trail
- Four options feels good
- Is well-known
- Continuity and cohesion when getting to the scenarios

CONS [32]
- "Flatland" = oversimplified
- Is a binary
- Dependency on getting the axes 'right'
- Potential for lower novelty or provocation

Hines states, the logic of using the 2x2 matrix, "is to spend time thinking about the factors that are crucial to the future, especially those with least clarity or vision of how they might play out." (p.03)[1]

Even with these pros and cons indexed, I believe this method was ideal for linking uncertainty to crucial visions of the future for this type of client.

CRITIQUE

This analysis applies the Gemeinschaft/Gesellschaft, Cultural Lag, and Diffusion of Innovations theories of Tönnies, Ogburn, and Rogers, to consider the relevance of social change theory to the four built environment foresight scenarios. After applying these theories, it was found that without considering foundations of social change, the scenarios could suggest a misunderstood dependance on rapid collaboration, technological integration, or widespread adoption. That suggestion fails to align with known social dynamics of trust, institutional adaptation, and innovation diffusion. Therefore, by incorporating these theories, all scenarios are better grounded in more realistic boundaries and speculations on more plausible outcomes.

SCENARIO 1

The "Doing Just Enough" scenario imagines the industry changing incrementally while maintaining traditional project delivery and fragmented relationships. (p.31)[1] Using Tönnies theory, this scenario maps well to a Gesellschaft-style structure characterized by low trust and individualism. [9] From this characterization, the plausibility of the scenario increases since it is continuous with existing norms rather than a shift or reversion to Gemeinschaft-like structures.

Layering in Ogburn's cultural lag theory also helps build understanding for the lack of institutional inertia and friction.[15] Due to culture lag, even modest technological upgrades could be seen as overly optimistic and institutions such as procurement offices and permitting agencies[33] often adapt more slowly than expected. This theory helps validate why "doing just enough," could be a very plausible image of the future.

Furthermore, from Rogers's diffusion perspective, this system would primarily consist of late majority to lagging adopters.[18] Many small subcontractors and legacy operations fall into this category since they have a weak motivation for innovation and low risk tolerance.[34] Thus, the scenario may underestimate how ingrained adoption barriers remain.

Scenario 01: Doing Just Enough
Firms make minimal incremental improvements to survive shrinking margins.

This scenario speaks well to existing structural barrier to change and could be strengthened by suggesting responses to entrenched union dynamics, procurement risk-aversion, and regulatory friction as forces that sustain industry stagnation.

SCENARIO 2

The "Manufacturing Model" scenario presents a future in which industrialized, highly standardized, and collaborative workflows dominate. (p.36)[1] Using Tönnies' framework, this scenario suggests a shift from a Gesellschaft environment toward a Gemeinschaft one. In this new structure, trust, transparency, and shared norms would become central.[9] Since there is currently, persistent level of adversarialism and entrenched incentive structures behind it,[35] this shift is less likely although of course not impossible.

Like scenario 1, Ogburn's cultural lag suggests underestimates for the time required for social and institutional systems to catch up to the suggested scenario.[15] Prefabrication requires synchronized change across code, procurement, contracts, and training.[36] All these systems move slowly, and the lag between technology and readiness would likely produce delays and misalignment.

From Rogers' diffusion lens, prefab innovation diffuses unevenly. [18] Large resource-rich firms may adopt quickly, but small contractors, regional authorities, and craft trades would likely lag substantially. The scenario also lacks some specificity that does not provide more realistic estimates apart from a near-universal adoption scheme.

Scenario 02: Manufacturing Model
Construction shifts to standardized, manufacturing-like methods that speed delivery through collaboration.

A more plausible future might suggest more hybrid or phased models of prefab adoption. While not all images of the future aim towards plausibility, the scenario could still be strengthened with more consideration of realistic transitional barriers, variability of local jurisdictional code, and the entrenched politics of subcontracting.

SCENARIO 3

The "Construction Smartens Up" scenario imagines a system of seamless data-sharing, transparent platforms, and smart technologies. (p.41)[1] According to Tönnies theory, this scenario is more ambitious than scenario 2. It requires high levels of trust and collaboration, including open data environments more characterized by a Gemeinschaft system. [10]

Ogburn's cultural lag further challenges the scenario's pace. Smart technologies currently outpace regulations and culture, especially at a more macro-commercial scale.[37] Building codes, procurement rules, permitting, and zoning would need to change in parallel with technology to fulfill ambitions for mega-structures. Cultural lag theory suggests these systems would move far too slowly for the scenario's pace of integration to hold within 10 years from reporting but perhaps could begin to emerge more consistently on a slightly longer time horizon. [13]

From Rogers' diffusion perspective, smart-construction technologies depend on a more system-wide adoption due to the level of their suggested integration. This idea is incompatible with uneven adoption patterns. [17] Innovators and early adopters may be onboard suggesting more niche or elite adoption, but not uniform industry transformation as it stands.

Scenario 03: Construction Smartens Up
The industry builds smarter, more integrated structures through improved collaboration.

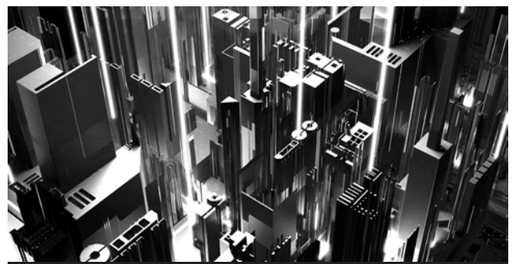
The scenario could be refined by incorporating staggered or extended adoption timelines that reflect the more realistic time to shift to Gemeinschaft systems. To increase plausibility, the scenario could also emphasize that emerging "elite niches," are more likely compared to a more sweeping adoption.

SCENARIO 4

The "New Tech Competitors" (p.46)[1] scenario presents a future in which external technology firms disrupt the construction industry by introducing platform-based models, automation, and data-centric control systems. From Tönnies' standpoint, this scenario is plausible because tech entrants operate in a Gesellschaft-like system that aligns with efficiency, standardization, and transactional relationships. [10]

Ogburn's theory of cultural lag, also supports increased plausibility in this scenario. The incumbent (construction firms) face significant lag between technological opportunities and institutional readiness to implement them. [38] This lag creates an opening for new competitors (technology firms) that are not encumbered by legacy systems. Tech entrants can innovate faster because they are not socialized into the industry's slow-moving norms, codes, or cultural expectations.

From Rogers' diffusion perspective, disruptive innovation from outside the system gives an advantage, to tech firms that align with classic patterns of disruptive entrants who capture and scale niche markets. [18] Adoption barriers apply more to the construction industry incumbents than to new actors. [38]



Scenario 04: New Teach Competitors
New high-tech entrants disrupt and challenge traditional construction players.

This scenario could be expanded by discussing potential issues around regulatory backlash, incumbent lobbying, and workforce resistance, which are likely responses to external disruption.

SYNTHESIS

It should be noted that "plausible" images of the future are not the goal for every foresight report. However, applying Tönnies, Ogburn, and Rogers's theories help to critique certain levels of plausibility, that would be beneficial to a client like the Construction Industry Institute, who seek tangible insights on disruptive strategic issues for the built environment. The original report provides a rigorous overview of the "Future of the Built Environment," and applying social change theories only work to strengthen and ground images in expanded possibilities.

Figure 07: Analysis Summary and Proposed Speculative Modifications to Scenarios Based on Critique and Recommendations (ref. digital tools)
Note: The proposed speculative scenario modifications are merely high-level ideas based on the analysis and recommendations to move the scenarios towards a more plausible outcomes informed by social change theory. Plausibility is not always the goal for all foresight research, however, these evaluations speak to trying to give more tangible insights to disruptive change for this client.

5 THE EXTENSION

SUGGESTED FORESIGHT PRACTICE ADAPTATION INFORMED BY SOCIAL CHANGE THEORY

POSSIBILITIES

Now that the social change theories of Tönnies, Ogburn, and Rogers have been explained and applied to the reports four scenarios, I wanted to explore possibilities to extend certain foresight tools with insights from social change theory. The following exploration is a bonus experiment that suggests a high level model adaptation and addition.

2X2 MATRIX SCORING

As detailed in the report, an exercise can be used in an implications workshop to evaluate participants' views on how the scenarios compare to one another. (p.29)[1] In the baseline exercise, participants rate the scenarios on how likely it is on a scale of 1-9 (9 is high) and how unprepared the organization is for that scenario on a scale from 1-9 (9 is high). These numbers are added to generate a composite score that identifies any opportunities that merit greater attention. The higher number indicates more likelihood and unpreparedness, warranting more attention.

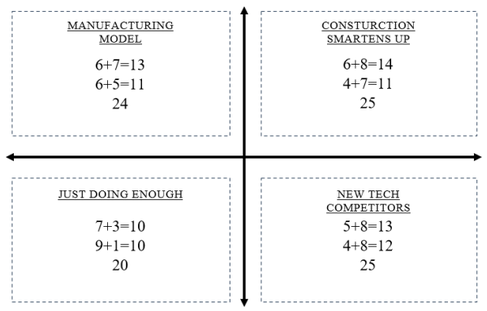


Figure 08: Scenario Evaluations, Baseline Exercise Result from Report. Numbers Indicate industry was most ready for "Doing Just Enough," Scenario (p.29)[1]

This same approach can be applied to social change dynamics, and extended to provide scoring for "social plausibility," based on selected social change theories. In this instance, "social plausibility" would be defined as the degree in which underlying social structures of change predict the possibility of that future scenario occurring. (see Table 01)

By grounding the assessment in the theories of Tönnies (trust requirement), Ogburn (cultural lag), and Rogers (diffusion difficulty), resulting scores provide a systematic way to determine where scenarios align with, or diverge from, real social dynamics in the built environment sector. (see Table 02)

Each theory corresponds to a diagnostic dimension:

1. Trust Requirement (Tönnies) examines whether a scenario relies on adversarial, contract-driven relationships or cooperation, transparency, and shared incentives.
2. Cultural Lag (Ogburn) assesses the degree of institutional delay between technological advances and the regulatory, legal, and normative systems needed to support them.
3. Diffusion Difficulty (Rogers) evaluates how easily innovations could spread across fragmented industries.

A consistent four-point Likert scale was created for each dimension, ranging from 1 (minimal change from current social conditions) to 4 (extensive structural or cultural shifts required). Higher scores indicate greater misalignment with present-day industry realities, and therefore lower social feasibility/plausibility. This is consistent with Ivana Milojevic's adapted model of the futures triangle in which heavier weights of the past exhibit marginal change while radical change results from less weights and more pulls of the future. [39]

TABLE 01 | SCORE DEFINITIONS

SCORE	1	2	3	4
TRUST REQUIREMENT (TÖNNIES)	**Minimal** • Works within adversarial norms • No shared data environment • Minimal coordination across trades • Traditional GC–subcontractor dynamics	**Limited** • Some coordination required but within familiar structures • Limited information sharing (BIM for documentation, not collaboration) • Minor contract changes	**Elevated** • Requires early alignment across trades • Relies on transparent costing, scheduling, or risk sharing • Prefab supply chains needing long-term commitments	**Extensive** • Requires full transparency and shared data platforms • Cooperative contracting (alliance, shared risk pools) • Unified incentives across an entire ecosystem
CULTURAL LAG (OGBURN)	**Minimal** • Changes compatible with existing codes and norms • Workforce skills are largely unchanged • No major structural reforms required	**Moderate** • Some regulatory updates needed • Training required but not transformative • Organizational change manageable	**Significant** • Requires sweeping regulatory reform across jurisdictions • Workforce retraining at scale • New procurement norms	**Severe** • Requires rewriting core legal, regulatory, zoning, and liability systems • Demands rapid institutional alignment across fragmented sectors • Cultural identity shifts
DIFFUSION DIFFICULTY (ROGERS)	**Minimal** • Tools easily adopted by many actors • Clear relative advantage • Compatible with existing workflows • Low risk	**Limited** • Adoption varies by firm size or trade • Some resistance from risk-averse groups • Needs training and support	**Elevated** • Uneven communication networks • Smaller subcontractors struggle to adopt • Requires significant investment or behavioral change	**Extensive** • Requires simultaneous adoption across ecosystem • Interoperable data systems • Multiple actors must adopt early • High switching costs, major cultural resistance

TABLE 02 | SCORE APPLICATION

SCENARIO	INSTITUTIONAL TRUST (TÖNNIES)	CULTURAL LAG (OGBURN)	DIFFUSION DIFFICULTY (ROGERS)	SOCIAL FEASIBILITY / PLAUSIBILITY (COMPOSITE SCORE)
1. DOING JUST ENOUGH	**1 — Minimal** (Works within familiar adversarial, low-trust structures)	**2 — Moderate** (Institutions lag even behind "incremental" digitization)	**2 — Limited** (Even basic tech diffuses slowly in fragmented subcontracting ecosystem)	**5 → High Feasibility** Plausible stagnation but requires acknowledging deeper lag and adoption barriers.
2. MANUFACTURING MODEL	**3 — Elevated** (Requires coordinated supply chains, transparency, long-term commitments)	**3 — Significant** (Prefab mandates sweeping changes to codes, training, and procurement norms)	**3 — Elevated** (Prefab adoption uneven across markets; high cost; resistance from trades)	**9 → Moderate Feasibility** Possible in pockets but not uniformly across industry.
3. CONSTRUCTION SMARTENS UP	**4 — Extensive** (Requires shared data environments, cooperative contracting, unified incentives)	**4 — Severe** (Smart-tech ecosystem requires institutional realignment and new liability frameworks)	**4 — Extensive** (Interoperability requires uniform early adoption—unlikely in fragmented ecosystem)	**12 → Low Feasibility** Socially unrealistic without transformative cultural and institutional shifts.
4. NEW TECH COMPETITORS	**1 — Minimal** (Tech entrants bypass traditional trust-based barriers)	**2 — Moderate** (Incumbent lag creates an opening; tech firms more aligned with digital norms)	**3 — Elevated** (Adoption occurs through competitive disruption, not synchronized diffusion)	**6 → High Feasibility** Highly plausible disruption pathway given incumbent stagnation.

COMPOSITING AND RESULTS

Although subjective judgment is still inherent, similar to the Houston report's original workshop exercise, the short descriptors in table 01 provide anchors for a frame of reference during scoring.

Composite scores range from 3 to 12, with the following interpretation:

3–6 = High Social Feasibility/Plausibility: Aligned with current structures, plausible with incremental change or external disruption.

7–9 = Moderate Social Feasibility/Plausibility: Achievable with meaningful barriers; likely in partial or segmented forms.

10–12 = Low Social Feasibility/Plausibility: Dependent on major cultural, institutional, or ecosystem-wide transformations.

Applying this scoring exercise to all four scenarios as shown in table 02, one can see reasonable alignment with the baseline exercise with Scenario 01, "Doing Just Enough," as most socially feasible / plausible because it is most similar to requiring minimal change from current social conditions. The rest of the scenarios break down as follows:

Most Plausible: Scenarios 1 & 4
Moderately Plausible: Scenario 2
Least Plausible: Scenario 3

Using this model, each scenario can be evaluated not only for its strategic relevance but also for its estimated social plausibility, offering a structured way to interrogate whether futures of the built environment rest on stable or unrealistic assumptions about how society actually changes.

6

CONCLUSION

RETURNING BROKEN GROUND

Barriers to change never stem from a lack of possibility, but instead the deeply embedded social structures that demand to be uncovered and understood. My gradual exposure to the built environment industry, and subsequent years of experience, have left more questions than answers on the relation between professional design practice, spatial futures, and social change.

This evaluation of the "Future of the Built Environment" report brings my curiosity full circle connecting a few of my personal observations to broader theory, marking the starting point for exploring how social change intersects with foresight practice. By applying Tönnies's analysis of social order, Ogburn's insights on cultural lag, and Rogers's framework of diffusion, this analysis demonstrates how strong foresight work can and should be reinforced through rigorous theoretical grounding. These evaluations then provide opportunities for extending tools, such as adding theoretical scoring dimensions to the 2×2 uncertainty structure to define levels of "social plausibility."

Successful images and scenarios of the future will never consist of floating and unmoored trends, technologies, or drivers. They exist in the context of real social, cultural, psychological, and sociological phenomena. In this case, social change theory does not constrain futures thinking it anchors it. It equips foresight practitioners with better ways to distinguish what is possible from what is plausible or emerging. And in a field as complex and consequential as the built environment, that grounding may be the most important part of breaking new ground.

"THERE HAS PERHAPS NEVER BEEN A TIME IN HUMAN HISTORY WHEN STRATEGIC FORESIGHT IS MORE NEEDED"

— Dr. Andy Hines

BIBLIOGRAPHY

WORKS CITED

INFORMATION

1. Hines, Andy, et al. "The Future of the Built Environment." *Houston Foresight*, Sept. 2019, www.houstonforesight.org/wp-content/uploads/2019/06/Future-of-Built-Environment_Final.pdf.
2. Team, DesignHorizons, et al. "Groundbreaking in Construction: Significance and Process." *DesignHorizons*, 15 Dec. 2024, designhorizons.org/groundbreaking-in-construction-significance-and-process/.
3. Mudge, JT. "Foresight and Change: Final Assignment." FORE 6331 Social Change, Fall 2025, *University of Houston, Houston*. PowerPoint Presentation.
4. Smith, Jack. "Construction's 2025 Challenges: Adapting to Volatility." *Hampton Global Business Review*, 12 June 2025, hgbr.org/constructions-2025-challenges-adapting-to-volatility/.
5. NetSuite.com. "How to Navigate Top Real Estate Challenges." *Oracle NetSuite*, www.netsuite.com/portal/resource/articles/erp/real-estate-industry-challenges.shtml. Accessed 30 Nov. 2025.
6. "Real Estate Industry Challenges, Change and What to Watch in 2025." *Kaizen Real Estate Group*, kaizengroup.net/blog/Real-estate-industry-challenges--change-and-what-to-watch-in-2025.
7. "Basic Information about the Built Environment." *EPA, Environmental Protection Agency*, www.epa.gov/smm/basic-information-about-built-environment. Accessed 30 Nov. 2025.
8. "About CII." *Construction Industry Institute*, www.construction-institute.org/about-cii.
9. "Gemeinschaft vs. Gesellschaft: Tönnies' Theory of Social Bonds Sociology.Institute." *Sociology Institute*, 6 Nov. 2025, sociology.institute/introduction-to-sociology/gemeinschaft-vs-gesellschaft-tonnies-theory/.
10. Tönnies, Ferdinand. *Community and Society* (Gemeinschaft und Gesellschaft). Translated by Charles P. Loomis, Harper & Row, 1957.
11. "Ferdinand Tonnies." *Sociologyguide.Com*, www.sociologyguide.com/thinkers/Tonnies.php#gemeinschaft.
12. Wickert, Christian. "Ferdinand Tönnies – Community and Society (1887)." *SozTheo*, 20 Aug. 2025, soztheo.com/sociology/key-works-in-sociology/ferdinand-toennies-gemeinschaft-und-gesellschaft-1887/.
13. Fisher, Dana, and Larry Michael Wright. "Cultural Lag." *The International Encyclopedia of Media Studies*, Wiley-Blackwell, 2015, pp. 1–12.
14. Easy Sociology. "The Concept of Cultural Lag: Understanding the Time Gap between Material and Non-Material Culture." *Easy Sociology*, 14 June 2024, easysociology.com/sociology-of-culture/the-concept-of-cultural-lag-understanding-the-time-gap-between-material-and-non-material-culture/.
15. Ruggiero, Josephine A. "Culture, Change, and Cultural Lag: A Commentary and a Challenge." *DigitalCommons@Providence*, digitalcommons.providence.edu/sbg/vol3/iss1/8/.
16. E.M. Rogers and F. F. Shoemaker, Communication of Innovations, 1971
17. E.M. Rogers, Diffusion of Innovations, 1983
18. "Origins of the Diffusion Paradigm." *Diffusion Research Institute*, 9 Nov. 2024, diffusion-research.org/research_articles/origins-of-diffusion-paradigm/.
19. Ezrati, Milton. "Aging Demographics: A Threat to the Economy and to Finance." *Forbes, Forbes Magazine*, 23 Apr. 2018, www.forbes.com/sites/miltonezrati/2018/04/23/aging-demographics-a-threat-to-the-economy-and-to-finance/#6c73b1f23f2e.
20. "U.S. Construction Labor Trends – February 2025: Blog." *RedHammer, RedHammer*, 1 Feb. 2025, www.redhammer.io/blog/u-s-construction-labor-trends---february-2025.
21. "Aconex Construction Management Platform." *Oracle*, www.oracle.com/construction-engineering/aconex/.
22. Thomas, Eric. "Digital Builder EP. 19: 3 Takeaways on Augmented Reality (AR) and Virtual Reality (VR) in Construction." *Digital Builder*, 20 May 2025, www.autodesk.com/blogs/construction/digital-builder-podcast-ep-19-ar-vr/.
23. Ingram, Kenny. "Modular Construction Will Build New Momentum in 2018." *For Construction Pros*, 13 Aug. 2022, www.forconstructionpros.com/business/article/20988270/ifs-modular-construction-will-build-new-momentum-in-2018.
24. Modular Building and Prefabricated Construction - *e-Architect*, www.e-architect.com/articles/modular-building-and-prefabricated-construction.
25. Cowin, Laurie. "This New Robot Can Tie Rebar on Bridges - and Cut Labor Hours in Half." *Construction Dive*, 1 Nov. 2017, www.constructiondive.com/news/this-new-robot-can-tie-rebar-on-bridges-and-cut-labor-hours-in-half/509801/.
26. "Construction Robots Business Analysis Report 2025: Market to Reach $659.7 Billion by 2030, Fueled by Demolition Robots, Labor Shortage, and Cost Reduction in Robotic Technology." *Yahoo! Finance, Yahoo!*, finance.yahoo.com/news/construction-robots-business-analysis-report-143400938.html.
27. Marinov, Bobby. "22 Exoskeletons for Work and Industry into 6 Categories." *Exoskeleton Report*, 7 Jan. 2019, exoskeletonreport.com/2016/04/exoskeletons-for-industry-and-work/.
28. Bousquin, Joe, and Jennifer Goodman. "New Construction Technology Releases: February 2025." *Construction Dive*, 12 Feb. 2025, www.constructiondive.com/news/new-construction-technology-exoskeleton-robotics-AI/739944/.
29. Marr, Bernard. "The Internet of Things (IOT) Will Be Massive in 2018: Here Are the 4 Predictions from IBM." *Forbes, Forbes Magazine*, 15 Apr. 2024, www.forbes.com/sites/bernardmarr/2018/01/04/the-internet-of-things-iot-will-be-massive-in-2018-here-are-the-4-predictions-from-ibm/#7d6bcfb2edd3.
30. "10 Keys to Understanding Construction Data Analytics." *Trimble Resource Center*, 2 Mar. 2023, www.trimble.com/blog/construction/en-US/article/data-analytics-trends-in-construction.
31. "Industry News." Industry News | *Construction Management Association of America*, 24 Nov. 2025, www.cmaanet.org/industry-news.
32. Cowart, Adam. "Intro Sp25 Week 5 Deck" FORE 6311 Introduction to Foresight, Fall 2025, *University of Houston, Houston*. PowerPoint Presentation.
33. Jacobson, Charlie. "The Top Reasons Why Permitting Is so Slow." The Top Reasons Why Permitting Is so Slow, *Pulley*, www.withpulley.com/resources/why-is-permitting-so-slow. Accessed 30 Nov. 2025.
34. Relationship between Subcontracting Models and Adoption of Innovative Methods in Construction Safety | *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction | Vol 16, No 4*, ascelibrary.org/doi/10.1061/JLADAH.LADR-1050. Accessed 1 Dec. 2025.
35. Is Integrated Project Delivery Sufficient to Reduce Adversarialism in the UK Construction Industry?, uwe-repository.worktribe.com/output/10979638/is-integrated-project-delivery-sufficient-to-reduce-adversarialism-in-the-uk-construction-industry.
36. Weyandt, Todd. "Breaking Prefab Barriers in Construction." *Bridging the Gap Podcast*, 12 May 2025, bridgingthegappod.com/article/prefab-construction-barriers/.
37. The Present and Future of Smart Construction Technologies - *Sciencedirect*, www.sciencedirect.com/science/article/pii/S2095809924007410.
38. Christensen, Clayton M. "What is Disruptive Innovation?" *Harvard Business Review*, 1997, https://hbr.org/1997/01/what-is-disruptive-innovation.
39. Inayatullah, Sohail. The Futures Triangle: Origins and Iterations, 2023, journals.sagepub.com/doi/10.1177/19467567231203162.

IMAGES

a. Klein, Mateusz. *Montparnasse Tower in Paris France*. 29 Dec. 2021. Photograph, Unsplash.
b. Santana Maias. *Grey Building Crane in Puerto Madero*. 04 Mar. 2019. Photograph. Unsplash.
c. Simmon, Andres. *Black and Brown Shovel on Green Grass*. 01 Aug. 2020. Photograph. Unsplash.
d. Santos, Elio. *Small Planet Photography of Buildings*. 28 Mar. 2019. Photograph. Unsplash.
e. Hines, Andy, et al. "Evolution of Framework Foresight (Part I)." Hinesight....for Foresight, 8 Aug. 2018, www.andyhinesight.com/evolution-of-framework-foresight-part-1/.
f. Ferdinand Urbahns - http://www.dithmarschen-wiki.de/Datei:FotoUrbahns.jpg b p k Bildagentur für Kunst, Kultur und Geschichte Märkisches Ufer 16-18 DE - 10179 Berlin
g. *William Ogburn*. https://acms.es/wp-content/uploads/2015/07/William_Ogburn.jpg
h. *Everett M. "Ev" Rogers* (March 6, 1931 – October 21, 2004). https://educationaltechnology.net/diffusion-of-innovations-theory/
i. Olubode, Tolu. *Gray Concrete Building Under Construction*. 19 Oct. 2017. Photograph, Unsplash.
j. Cardinalli, Clayton. *Man in Blue Jacket Standing Beside Brown Wooden Post*. 25 Jun. 2020. Photograph, Unsplash.
k. Soh, Danist. *Grey Concrete Building Covered Trees*. 05 Jan. 2016. Photograph, Unsplash.
l. Pavor, Alex. *A Group of Computer Servers*. 29 Mar. 2022. Rendering, Unsplash.
m. Thomson, Cara. *Architectural Photography of Beige Wall*. 01 Aug. 2019. Photograph, Unsplash.
n. Mock Up Graphics. *Brown and White Round Decor*. 11 Mar. 2021. Photograph, Unsplash.
o. Jeffs, Lee. *A Reflection of a Building in a Mirror*. 02 Aug. 2024. Photograph, Unsplash.
p. Yost, Gary. *Black Spiral Staircase with Black Metal Railings*. 10 Feb. 2021. Photograph, Unsplash.

DIGITAL TOOLS

USE OF AI, CITATIONS | CHATGPT-5

Following my diagram, what is a recommended outline for the evaluation of this report" prompt. ChatGPT, 25 August GPT-5, OpenAI. chat.openai.com.

- Result: the model suggested a detailed format that included an introduction, summary, theories, and analysis.
- Response: I generally followed this structure but did add an extension section as I explored my topic more. Also, as I approached the assignment I decided I wanted to do a more narrative and artful presentation.

"Identify gaps in theories, theorists, applied to the evaluation of this report" prompt. ChatGPT, 25 August GPT-5, OpenAI. chat.openai.com.

- Result: the model suggested an additional long list of theorists.
- Response: It was very difficult to narrow down the list of potential theorist, but since the report focused on construction and technology, I felt the three final selections applied well to the scenarios.

"Create a summary flow table of ___" prompt. ChatGPT, 25 August GPT-5, OpenAI. chat.openai.com.

- Result: the model helped me to develop summaries of my argument through diagrammatic flows which I did use to help me create the summary bullets on diagrams.
- Response: I did use AI to help take my argument into component bullets that I put in my diagrams.

USE OF OTHER DIGITAL TOOLS

While I prioritized human feedback and had a friend and family members review, I also used some digital tools that focused on grammar and citations.

"EasyBib: Free Bibliography Generator - MLA, APA, Chicago Citation Styles." EasyBib, Chegg, www.easybib.com/.

- While formal academic writing format was not stated as required, I did use EasyBib to provide MLA-like formatted citations on my sources for the bibliography. These were included as superscripts as notes on the details page.

"Grammar Writing Assistance." Grammarly, www.grammarly.com/.

- I used a free version of Grammarly for providing grammatical suggestions, some of which I took. Primary suggestions taken were obvious misspellings, typos, and missed comma placement. I tried to retain my original voice as much as possible and did not take all clarity or general suggestions.

"The World's Favorite Online Thesaurus!" Thesaurus.Com, www.thesaurus.com/.

"Manchester Academic Phrasebank." Academic Phrasebank Home, www.phrasebank.manchester.ac.uk/.

- I used these tools for wordsmithing repetitive phrasing.

Layout Design and Desktop Publishing Software | Adobe InDesign, www.adobe.com/products/indesign.html.

Vector Graphics Software | Adobe Illustrator, www.adobe.com/products/illustrator.html.

- Adobe InDesign and Adobe Illustrator were used create visual diagrams and report layout.

DISCLOSURE

In efforts to extend ethical practices of AI and usage of digital tools. Please reach out to me if any questions arise or clarifications are needed.

SOCIAL
CHANGE

THIS ARTIFACT WAS CREATED IN FULFILLMENT OF THE FINAL ASSIGNMENT REQUIREMENTS TO DESCRIBE HOW SOCIAL CHANGE IS IMPORTANT TO FORESIGHT

XIE MAGGIE HILL | FORE 6331 - PROFESSOR JT MUDGE | DECEMBER 2, 2025