

Future Pathway for Industrial Mega-Project Delivery



**APPROVED FOR
DISTRIBUTION &
RELEASE**

WHITE PAPER

By George Jergeas,¹ PEng, University of Calgary & Robert Porter Lynch², GO Productivity

With the Support of



EXECUTIVE SUMMARY

The Challenge: Mega capital projects, like Alberta Oil Sands projects, typically experience huge cost and time overruns (50-100% over time and over budget), making investments questionable, seldom attaining the expected returns for such massive investment of time and capital. Investments are already moving to more efficient areas of the world. A far more effective project delivery approach is essential.

Evaluation: This paper provides a review of current industry challenges and an evaluation of the three project delivery models – Adversarial, Transactional, and Collaborative – including the factors needed to influence success, lessons learned, and project execution innovations that can provide a stable, predictable, and profitable project. Large project best practices from Alberta and around the world have been sourced

Recommendation: In virtually every case, the collaborative industrial model, powered by trust, teamwork, collaborative innovation, and strategic alliances, consistently delivers more effective results when used properly. The collaborative model is an evolutionary product of research, “best practices” and implementation on more than ninety construction and engineering projects in Canada, plus experiences from hundreds of other cases throughout the world.

The review of the models strongly suggests the need for changing industry mindsets and proposes key ideas and steps for the executives in the Mega Project environment to create a Collaborative Construction initiative.

We propose the “next practice” evolutionary step in Mega Project construction: the Aligned Construction Enterprise (ACE) to address the current structural and organizational deficiencies in

¹ George F. Jergeas is Professor of Project Management at the University of Calgary. His current interests are focused on construction productivity, team dynamics, the drivers of cost overruns and delays on Mega Projects, benchmarking and claims dispute resolution. He has facilitated more than 90 partnering projects in Canada, email: Jergeas@ucalgary.ca

Both George and Robert work closely with Productivity Alberta

² Robert Porter Lynch is the founder of the Association of Strategic Alliance Professionals. He has written several books on alliance best practices, has facilitated the successful creation of scores of alliances in numerous industries, including construction, and serves as adjunct professor at the Universities of Alberta and British Columbia, teaching strategic alliances to senior executives, email: RobertLynch@warrenco.com

Future Pathway for Industrial Mega-Project Delivery

project delivery and create a highly competitive and productive “best practice” model for the future.

Future Pathway for Industrial Mega-Project Delivery

Table of Contents

THE CHALLENGE	5
Cost & Schedule Overruns	5
Risk Management and Trust	7
Systemic-Strategic Obstacles to Improvement.....	8
Robust Systems Design Architecture Needed	10
Three Competing Options for Project Delivery.....	11
1. Adversarial Project Delivery Model	14
Lack of Productivity Growth	15
2. Transactional Project Delivery Model.....	15
3. Collaborative Project Delivery Model	16
Best-In-Class Collaboration Results.....	16
Oil Sands Projects Thrive with Collaborative Construction	16
Creating Value Starts with Commitment to the Values of Integrity & Fair Play.....	17
COLLABORATIVE CONSTRUCTION – THE CLEAR CHOICE	18
Evaluating the Model for the Path Forward	18
Devon’s Steve Bass’ Tips and Insights.....	20
BACKGROUND ON COLLABORATIVE CONSTRUCTION	21
ALIGNED CONSTRUCTION ENTERPRISE – THE NEXT GENERATION	22
Need for Alignment & Integration	22
Alignment Requires Early Engagement	23
Critical Success Factors for the Service/Systems Integrator.....	25
Key Principle: Sharing Expands Possibilities, Hording Contracts.....	27
Critical Success Factors: Foundation of the Aligned Construction Enterprise.....	28
1. Complete Value Chain/Network Strategy.....	28
Strategic Alliances:	28
From Supply Chains to Value Networks	28
Safety is Designed into the Project from Inception.....	29
2. Senior Executive Commitment	30
Collaborative Construction Requires Strong Leadership.....	30
Devon ‘s Commitment to Building Trust	31
5. High Performance People	33
6. Careful Selection of the Delivery Team	33
7. Focus on Schedule.....	34
Shifting Mindsets	35
Devon’s Commitment to Excellence.....	35
Myopic versus Holistic Risk Management	38
Trust Reduces Risk.....	37
The Most Important Thing for Leaders to Know.....	38
Leadership Drives Culture which Drives Behavior	38
CONCLUSIONS	39

Future Pathway for Industrial Mega-Project Delivery

Acknowledgements: The author's deeply appreciate the support from Go Productivity (formerly Productivity Alberta), in particular Lori Schmidt and Allison Byrne, and the team from June Warren-Nickles, including Ian McGillvary, Chaz Osburn, and Rob Penteny. We especially thank Steve Bass from Devon Canada, Gary Bunio of Suncor Technology Development, Gerry Brunka recently retired from Suncor, Maggie Hanna from Common Ground Energy Corp. and Bob Overton from TriOverton for their generous contributions, insights, and positive challenges to spark our thinking.

Authors' note: We have intentionally kept this white paper short and to the point to make this document both readable and actionable. Substantiating data for validation can be obtained by contacting the authors.

In early 2015 we will be publishing, through Go Productivity, a more detailed manual on Collaborative Construction, which will delve into these issues in more depth.



THE CHALLENGE

Major industrial development projects are mega engineering and construction undertakings ranging between \$8-10 billion in capital investment and employing thousands of workers, engineers, suppliers, contractors and support staff. Mega Projects are characterized by:

- Magnified cost
- Extreme complexity
- Increased risks, some of which are outside the control of the project management team or even the executives
- Environmental, regulatory and community impacts
- Interface management issues
- Labour availability and management issues
- High visibility, and in most cases....
- Cost over-runs that exceed total project cost or approved budget.

Mega Projects are notorious for running over budget and schedule. Oil Sands projects in Alberta typically experience overruns of 50-100%

Although success is the goal of all project stakeholders, it has been difficult to achieve; 50-100% overruns in budget and time are the norm. Success/effectiveness and the extent of learning from experience are becoming a major challenge in today's mega project delivery. Literature is flowing with documents and papers about repeated global cost overruns and delay cases. Investors are shifting their capital to other, more efficient areas of the world. Our research has identified a host of major challenges facing the delivery of Mega Projects.

Leading Causes for Cost & Schedule Overruns

In 2002, a study conducted for the Government of Alberta, Canada by Bob McTague former President of Optima Engineers and Constructors (now Hatch) and Dr. George Jergeas of the University of Calgary, found that cost and schedule overruns on large oil and gas construction projects were the result of the apparent "management" deficiency in managing scope, time, quality, cost, productivity, tools, scaffold, equipment, materials and lack of leadership, among other things.

A 2011 industry study by Independent Project Analysis (IPA) 2011 found that 78% of upstream Mega Projects faced either cost overruns or delays, a deterioration from 2003, when 50% of the projects were over budget or late.

It's not getting better; it's getting worse.

Another investigation by Dr. Jergeas shows that the overruns continue to be a major challenge facing industry and reveals the following reasons for cost and schedule overruns:

1. **Unrealistic or overly optimistic original AFE (Authorization for Expenditure) cost estimate and schedules**

Future Pathway for Industrial Mega-Project Delivery

The underestimation of project costs may be explained by many reasons such as, the under appreciation of project complexity, interfaces, interdependencies and risks associated with the mega project environment. Some risks are outside the control of the project management team and company executives.

2. **Incomplete scope definition or inadequate Front End Loading/Planning prior to AFE**

Incomplete scope definition and inadequate Front End Loading/Planning are mainly due to

- the fast-tracking nature of Mega Projects and ongoing changing customer requirements resulting in scope changes throughout the life cycle of the project
- lack of understanding of the cumulative impact of scope changes on project cost and schedule add another dimension to this issue
- client's and engineering firms' practice of pushing work to the field early puts construction under an unrealistic compressed schedule with increased overtime requirements and often with little or no cost consideration for the field cost.

3. **Inappropriate project strategies for the mega environment**

Some project strategies deployed do not properly consider

- the level of scope definition
- the fast track nature of the mega project environment
- market condition
- owner participation
- owner control and
- owner risk.

Improper or late consideration of the project strategies relating to design, procurement, construction, prefabrication and assembly and commissioning adds to cost overruns.

4. **Mismanagement of the construction phase**

The mismanagement of construction operations specifically

- later than anticipated engineering, vendor data, equipment and material deliveries
- inadequate plan of execution, and poorly defined tasks and division of responsibility
- inexperienced or poorly equipped project management personnel and supervisors, coupled with the inability to understand, plan, adapt, implement project management procedures or systems
- lack of standardization and fit-for-purpose design including inadequate use of shop fabrication, modularization strategy and constructability reviews, and
- poor communication, team work and alignment between the players leading to adversarial relationships and protracted disputes.

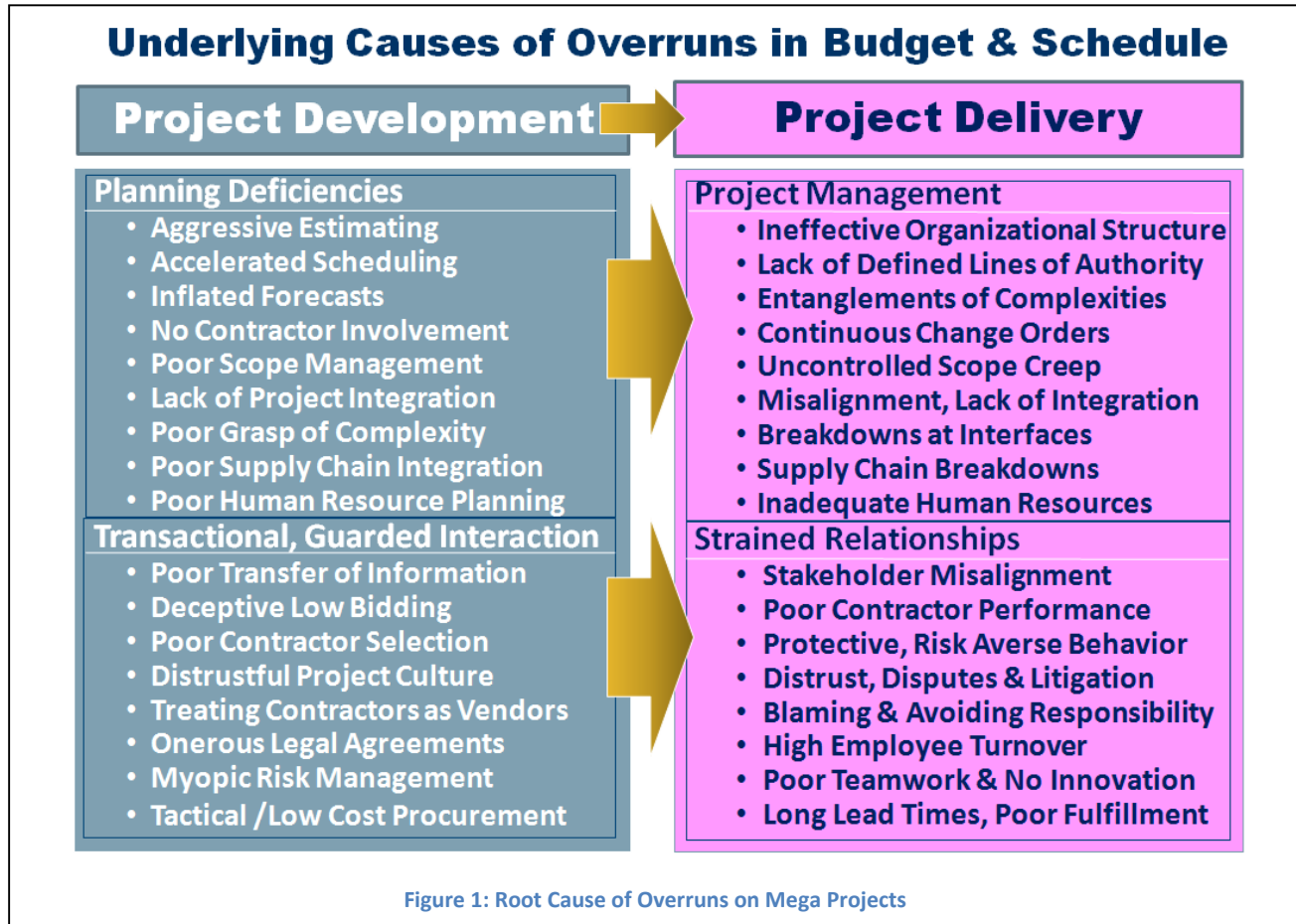
All dramatically contribute to low labour productivity and cost overruns.

Ernst & Young examined 205 current oil & gas Mega Projects across the globe, finding that current project estimated completion costs were, on average, 59% above the initial estimate.

If this were a disease, we'd call it a "pandemic"

Future Pathway for Industrial Mega-Project Delivery

Numerous other studies have isolated a number of causes of low construction productivity and cost



overruns. In Figure 1: Root Cause of Overruns on Mega Projects, we summarize the underlying causes and the contributing issues for the poor project results. In our analysis of complex projects that ran over the projected time and budget targets, many of the problems occurred in two time-spans separated by the Approval for Expenditure (AFE) Gate – Project Development and Project Delivery.

Risk Management and Trust

Mega Projects are high risk, complex ventures. Traditional risk management calls for handling risk by insulating, insuring, shedding, or avoiding risk. This approach is often myopic when assessing the development of a Mega project. Many key factors are often overlooked.

Excessive risk aversion can cause severe distrust, which counter-productively *increases* risk. We have found that risk is *escalated in adversarial* construction and conversely *decreased in collaborative* construction. Contracts filled with pages upon pages of excessive legal protections and penalties can actually backfire, causing people to protect themselves rather than take actions that would advance productivity on the job. Risk premiums added by contractors, and legal/ litigation costs, are two consequence of excessive risk management that can drain profits and executive energy. The inherent complexities of a Mega Project are

Future Pathway for Industrial Mega-Project Delivery

severely exacerbated in distrustful environments. Our studies of the Economics of Trust³ have demonstrated that trust dramatically improves speed, innovation, forecasting, joint planning, and reduces cost among other factors.

Ironically, Canada is inherently one of the 10 most trustworthy countries in the world;⁴ *trust is a national asset*. But Mega Projects often craft legal contracts armed like a battleship ready to fight. Instead we should exploit Canadian's natural propensity for fair play, and be very selective about who gets to play on the project management field, excluding those few who can/should not be trusted.

Once risk management gathers momentum, often it becomes the universal solution to everything. *Risk management then is misapplied to any issue of uncertainty,⁵ for which innovation would be the proper approach*. But because trust is missing, innovation is overlooked as the best solution. What's more, while risk management can be written into a contract, trust and innovation cannot.

Systemic-Strategic Obstacles to Improvement

The problem in the industry is not one that can be fixed by isolating each individual problem and fixing the problems piecemeal, one-by-one. If this were to be true, the problems would have been corrected by now. The difficulty in the construction industry is two-fold.

First, historically the industry has grown up from a 'cottage' industry, where many got their start building homes or commercial structures. It is a "dirty fingernails" industry (no demeaning criticism intended here) where top managers today often got their start in the apprentice system beginning as laborers. They learned to climb the ropes as supervisors, then site or project managers. From this perspective they were not trained to see the strategic and systemic issues in their industry. Thus the mindset of the industry is still oriented to "projects" and their expeditious completion, not to "systems change."

Second, the industry is deeply structurally fragmented, with divided interests that have little trust in each other, and thus limited collaboration, which is foundational to joint problem solving, fast-track delivery, and innovation. The following description (from *Managing Integrated Project Delivery*, Thomsen, Darrington, Dunne, & Lichtig, 2009⁶) clearly states the structural difficulty:

³ Study conducted in workshops throughout Canada and the U.S. Over 3,500 senior managers evaluated the impact of trust on key operational factors. Universally executives reported a minimum of 30% advantage in each of the factors when evaluating high trust over low trust organizational cultures.

⁴ Source: Transparency International. See www.transparency.org. High Corruption (Low Trust) Countries are ranked as higher risk. When making financial assessments, High Trust countries receive better financial terms.

⁵ This sets the foundation for making more distinctions, which we should perhaps elaborate upon. "Risk" is often attached to "discount or premium factors" which can be quantified. Insurance companies do this with extreme precision – such as the risk that a flood will happen in a specific location. Uncertainty is not nearly as precise, being unquantifiable and statistically unverifiable. Uncertainty, because it is a psychological phenomenon, has greater impact on contingency planning, trust building, and clarity of roles & responsibilities.

⁶ Reprinted with permission

Future Pathway for Industrial Mega-Project Delivery

Stated briefly, construction projects frequently suffer from adversarial relationships, low rates of productivity, high rates of inefficiency and rework, frequent disputes, and lack of innovation, resulting in too many projects that cost too much and/or take too long to build.

Projects continue to injure or kill too many workers, and owners are often disappointed with the quality of the end product..... Traditional project delivery systemsroutinely produce results that continue to disappoint owners and frustrate much of the construction industry.

Typically, construction projects are organized into three “camps” with diverse interests that sometimes converge and other times are opposed: Owner, Designer and Contractor. Project participants come into their camps at various times during the project, with designers coming on early, and general and trade contractors coming on after design is substantially complete. Project communications typically reflect contractual lines, so a trade contractor’s issues flow up to the General Contractor, over to the owner, and if needed, down to the design consultant having the answer. As a result, traditional projects have organizations that resemble silos or chimneys, with each camp organized vertically and separated from each other by contractual walls.

What’s the problem with this? It practically ensures that:

- **Design effort is wasted** because information about cost, constructability and operability preferences only come to the designers, if at all; at a few milestones after substantial design effort has occurred, thereby requiring re-design.
- **Construction costs are higher** because general contractors and trade contractors will pad their prices with contingencies resulting from the owner’s risk allocation strategy and their uncertainty about the meaning/completeness of the design, in which they had little or no involvement.
- **Engineering safety factors are extreme**, as the engineers have no assurance concerning the capability and quality standards of the trade contractor who might ultimately be the low bidder. In order to avoid an underperforming system, engineers often overdesign the system’s capacity.
- **Change orders result** because the contractor’s first chance to point out problems in the drawings occurs after they have provided their final prices. Additionally, trade contractors who know best how to influence the design in order to improve productivity and constructability are excluded from the design process. [Change Orders may also become the “get even” opportunity for contractors and sub-contractors, who were beaten up on price in the original negotiation, to over-charge to make a fair profit.]
- **Relationships are adversarial and disputes more frequent.** Imagine a situation where the party who is alleged to have made a mistake is also the party who decides whether that assertion is valid. That is routinely the position that architects and engineers are in. The contractual structure encourages each party to look to its own interests rather than the interests of the project as a whole. Lack of constructor involvement in the design phase reduces the level of common understanding of the project among the players, resulting in more mistakes, misunderstandings and blame. The stove-piped lines of communication often result in long-distance and arms-length relationships among project participants, hindering collaboration and increasing the likelihood of misunderstanding and mistrust.

Future Pathway for Industrial Mega-Project Delivery

Believing that just “fixing the problem by attacking the pieces of the problem” clearly has not, and cannot work. Every attempt at solving the problem piecemeal has failed. Why?

Because this is a “strategic systems” problem, not a “fix the broken parts” problem.

To use an analogy:

WWII produced the fastest, most sophisticated *propeller*-driven aircraft ever created.

But prop-driven planes were not capable of flying at super-sonic speeds; a new “systems design” was needed using *jet* propulsion.

Further, jets were not capable of flying outside the earth’s atmosphere; a new “systems design” was needed using *rocket* propulsion.

Inherently the current method of delivery of construction services is misconstrued and misaligned. These misalignments then manifest as symptoms of having “broken parts.”

Robust Systems Design Architecture Needed

Similarly, what’s needed to address the malaise in the Industrial Sector’s Mega Projects is a ‘rocket-propelled strategy’ – a “Robust Systems Design Architecture” that meets the following nine success criteria:

1. Provides Excellent Value for the Money Invested for Owners, Designers, & Contractors
2. Ensures Fast delivery which is On-Schedule, On- Budget *or better*
3. Produces High levels of:
 - collaboration,
 - innovation,
 - integration..... that are paramount to success
4. Creates coherent Alignment of:
 - mutual interests & shared responsibilities
 - fair allocation of risks & rewards for innovation, time & cost savings
 - joint vision and value creation
 - design-delivery interfaces which are embraced from start to finish
5. Built on a Foundation of Trust that facilitates:
 - rapid decisions and readjustments
 - effective joint decision making & value based solutions
 - efficient deployment of resources
 - high levels of collaborative innovation
6. Works in an environment where:
 - Climate is Adverse

Collaborative Innovation is sourced from the basic principle that the best new ideas come from differences in thinking – people who challenge the status quo, ask difficult questions, and iteratively postulate new possibilities. The interplay of differences fostered in a trusting, honoring environment, yields co-creativity and synergy.

Future Pathway for Industrial Mega-Project Delivery

- Risks are difficult to define
 - Scope may be uncertain or changing
 - People are considered a critical resource needing development & attention
7. Costs can be managed through a rigorous and innovative target costing process
 8. Public Stakeholders and Environmental Drivers are embraced
 9. Attracts Resources (Capital, Human, Mechanical, Technical) in a tight market

Two perplexing strategic questions must be addressed:

First: What “Robust Systems Design Architecture” will meet the above 9 success criteria?

Second: With all the study devoted to analyzing the problem, why has the construction industry been so impervious to change?

Without a clear understanding of why such essential aspects of construction are “impervious to change”, it is close to impossible to effect any major innovation. The answer to the conundrum and finding a new “Robust Design Systems Architecture” lies in understanding the competing options for project delivery.

Three Competing Options for Project Delivery

Underlying these difficulties is an interwoven set of three different frameworks composed of belief systems and supporting methods that are causing fragmentation and misalignment within the construction industry. These three frameworks are actually driving competing project delivery models or systems, each quite different, each founded on different beliefs and philosophies:

Adversarial, Transactional, and Collaborative

Unfortunately these three are not clearly differentiated or well defined in the minds of most business and project leaders in the construction industry. Yet each model produces very different results.

Each of the three models has a set of advantages and disadvantages, and a right time and place for using them. An adroit leader knows how to mix them together appropriately – but only if they are overt, appropriately positioned, and skillfully implemented.

For example, in dealing with highly unethical people, an *adversarial* approach may be appropriate. The *adversarial* model is positioning the firm to fight, apply win-lose gaming, protecting one’s territory, and taking an adversarial attitude. But dealing in a prolonged adversarial manner with a critical union or contractor relationship will ultimately end in a lose-lose for both parties; a *collaborative* engagement will ultimately turn far better results.

The *transactional* model is about bargaining, trading, and price-driven exchange. A business model like eBay or Amazon benefits from an efficient *transactional* system.

In contrast, the *collaborative* model aims at working together, sharing ideas, aligning interest, fairly apportioning risk, and developing fast innovation. It is best used in complex, long-term projects where the stakes are high and ambiguity or uncertainty is likely to arise during delivery.

Future Pathway for Industrial Mega-Project Delivery

Table 1 (following) illustrates the three distinctly different models of project delivery and provides further details of its characteristics.

Each model has very different beliefs, underpinnings, motives, outcomes, and advocates.

Future Pathway for Industrial Mega Project Delivery

Table 1: Spectrum of Three Competing Models of Project Delivery & Their Characteristics

	Adversarial	Transactional	Collaborative
Key Beliefs	Business is a "Psychological War Game;" Winning comes from Power	Trading, Bargaining, & Differential Views on Value Produces Economic Exchange	Extreme Value is Generated when people work in teams to Push the Envelope on Performance
Behaviors	Argumentative, Money Rules, Use Age, Experience, Position or Budget to get your way, "dog eat dog"	Squeezing & Positioning enables you to get the best result in Negotiations, throw a bone to sweeten the deal	Co-Creative, Teamwork, Trustworthiness, Highly Ethical & Honest; Maximize what's in the best interests of the whole
Rules of the Game	Pressure others; Winning is a result of Cunning & Craftiness; Hype your importance; Protect your backside; Don't Trust Others or you will get screwed; Everything is Win – Lose	Take advantage of every opportunity, Exploit weaknesses; Timing is critical; Perception is everything; Trust but verify; Use lawyers to ensure protection; Everything is in the "deal"	Create value & competitive advantage by using Teamwork (internally) & Alliances (externally). Close integration between operating units, suppliers & Close attention to customers/client; Strive for Win-Win
View about Risk Management and Creating "Synergy"	Synergy is an impossible dream, (don't even think about it.). Manage Risk with tough contracts & tougher legal team empowered to litigate	Synergy is derived from High Efficiency and elimination of Non-Value Added Work. Risk Management, insurance, and shedding risk will limit losses	Synergy is a result of high levels of trust, teamwork, and alignment of goals & values. Use high trust architecture to reduce risk. The biggest risk is failure to adapt & innovate to emerging risks and opportunities
Value Proposition	Minimum Required to Close a Sale; Squeeze vendors in supply chain	Competitive Price, Acceptable Quality; transact through supply chains	Performance Excellence thru Value-Networks, Good Price, Speed, and Innovation
Framework for Negotiations	Winning is essential for me; I get more if I push, squeeze, and threaten to ensure I leave nothing on the table. I'm stronger if you're weak	What happens to you is your business. Long term relationships are only the product of me getting what I need/want. Switch suppliers to get best deal.	A Win/Win is essential to create productive long-term relationships to mutually thrive. Use our different needs & perspectives as the source of collaborative innovation.
Competitive Advantage	Gained from Size & Money	Gained from Proprietary Information & Bargaining	Gained from Value Co-Creation and Sharing
Information Sharing	Horde Information – It is Power	Contractor responsible for interpretation of information	Share Information to create more new ideas
Trust Level	Distrust, Deception, Aggression, & Manipulation Prevalent	Caveat Emptor (buyer beware) Trust is elusive and unsustainable	Trust is essential to generating a continuous stream of new value

Author's Note: While we have separated and distinguished the three key themes – *adversarial*, *transactional*, and *collaborative* -- in order to provide a better understanding and diagnosis of their impact, in reality these three themes act as interwoven threads in the fabric of the construction industry.

The result is often that a project, rather than running straight according to one of the competing themes, instead traps the participants in a cross-fire: the "muddle" of different philosophies, objectives, and ways of management. The end result is misalignment and fragmentation resulting in missed deadlines, budgets, and objectives.

Future Pathway for Industrial Mega-Project Delivery

The central question is:

“Which of the three models best responds to the systemic and strategic obstacles and creates the most suitable sustainable competitive advantage as measured by ‘On Time, On Budget, On Target’ delivery?”

The secondary question is:

“Which of the three models is most likely to:

- Provide competitive advantage
- Be adaptable to changing competitive forces and project risks
- Enable continuous improvement and innovation
- Fully engage its key stakeholders such as contractors and their workforce
- Enhance stakeholders profitability
- Be most productive and reduce non-value added work
- Reduces conflicts and non-value added work
- Be friendlier to the environment and the community in which it exists?”

The answers to these two questions are fundamental to determining the future pathway of Mega Project delivery. First, let us discuss and assess the three models in more detail to understand their underlying beliefs and impacts.

1. Adversarial Project Delivery Model

The *adversarial* model’s objective is winning at all costs. Based on self-interest, strong-armed bargaining, and strong self-protection, it places barriers between each entity in the value chain. When placed under stress, the lack of trust typically fractures at the interface between organizations, pitting one against the other, with the strong chance of degenerating into hard-nosed adversarial disputes. This model, in the extreme, relies on negotiations driven by win-lose bargaining and an army of lawyers to shift risks to contractors along with onerous contracts that assure the destruction of joint problem solving and trust-building at the outset.

While logical in theory, win-lose is irrational in the realities of real human interaction, driving those people on the losing end to get even, to form unions, to file grievances, withhold information, to fail to cooperate, and to hunker down in silos, all the while adding layers of non-value added work to the project equation.

Adversarial relationships generate significant after-shocks which manifest as law suits, high employee turnover, customer churn, and projects that consistently run over-time and over-budget. Productivity is severely jeopardized

An Owner/Investor typically seeks about a 15% ROI (Return On Investment), which doesn’t commence until *after* the project commences delivery. On a Mega Project, where the investment is in billions of dollars, it is to the Owner’s/Investor’s advantage to bring the project in ahead of schedule and under budget. But adversarial contracts emphasize liquidated damages and litigation, rather than incentivizing all the firms and their employees involved in project delivery to cooperate for the long term benefit of the Owner/Investor.

Collaborative Construction

and innovation grinds to a halt in this model; high concern with self-protection results in defensive, not innovative, behavior.

The consequence of increased proliferation of transactional and adversarial models in the construction industry is severe: over the last forty years -- despite computers, better equipment, and improved materials -- productivity has decreased (see Figure 2: Productivity Loss in Construction) using the Transactional Project Delivery Model

“Transactional” model is based on an economic belief that everything is a “deal” and lowest price paid with highest return governs decision choices. Fundamentally, *transactional* thinking has a very narrow objective: increase shareholder value and increase profits. It treats those who deliver projects as “vendors.” “Vendoring” is a set of beliefs that drives decisions such as outsourcing to Asia, choosing to pay legal defense costs rather than making a compromise with a supplier, or choosing the lowest price even though a contractor may be deficient in quality, safety and productivity practices that result in cost overruns and project delays.

It’s not that something is “wrong” with this kind of thinking; it’s what’s “missing” from this thinking that is disturbing. There is:

- No regard for ensuring that the entire project delivery system is *aligned* in terms of goals, measures of success, integration between delivery specialties, or how rewards will be fairly allocated to ensure everyone is acting together.
- No method to ensure the contractors/employees/ supply chain of a project (who invest their time, commitment, and loyalty) are treated fairly or given any security (such as a favorable rating on the next project) in exchange for their full engagement and successful achievement.
- No support for building high levels of trust, teamwork, or innovation which create the competitive advantage that enables sustained project delivery success.

Because these safeguards are not built into *transactional* thinking, when difficulties and conflicting objectives arise, all-too-frequently the project begins to breakdown under stress, spinning out of control into an adversarial game that sets the participants against each other.

Lack of Productivity Growth

In the last fifty years, according to many analysts, productivity in the construction industry declined (by contrast, the productivity rate within the manufacturing & industrial market sectors has more than doubled).

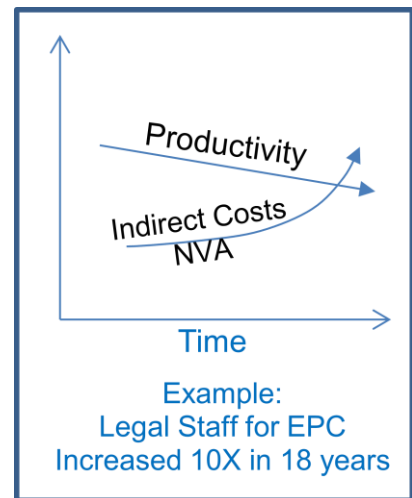


Figure 2: Productivity Loss in Construction

Many attribute this decline to the introduction of layers of Non-Value Added (NVA) work from excessive accumulation of *transactional* and *adversarial* protection mechanisms over the years.

Future Pathway for Industrial Mega-Project Delivery

2. Collaborative Project Delivery Model

The collaborative approach is designed to establish working relationships among the parties through a mutually-developed, formal strategy and operational alignment of conception, commitment, communication, and execution. It attempts to create an environment where trust, teamwork and innovation prevents disputes, fosters a cooperative bond to everyone's benefit, and facilitates the successful completion of projects. The model typically entails a considerable up-front investment in time and resources to forge a common team identity among participants from different organizations. It also involves the creation of mechanisms designed to sustain and expand collaboration over the course of the project.

The Collaborative Construction model sees that the purpose of a project is to deliver in a cost effective manner, on-time, on-budget, on-target, competitively, safely, ethically, and sustainably at a fair profit for all. Project stakeholders include clients, investors, engineering and construction contractors, subcontractors, employees, and suppliers, and the larger community in which the project resides.

It is the responsibility of project management to *align and balance* these stakeholder interests to ensure that each is incentivized to work together and receives a fair return. Companies that adhere to the collaborative model see that the foundation of a project is built on sound ethical principles, an adherence to trustworthy behavior, and a deep understanding of the needs and requirements of its stakeholders including contractors and suppliers.

Oil Sands Projects Thrive with Collaborative Construction

Sometimes it takes the exception to prove the rule. In the case of Devon Energy of Alberta, they built three 35,000 barrels/day facilities. The first phase (named "Jackfish 1") was built based on *transactional* contracting. Jackfish 2 was a "hybrid" using *transactional* and *collaborative* approaches.

By the third edition, Devon had converted to a *collaborative* construction model; the results were very gratifying: ahead of schedule, on budget, and a stellar safety record – the three hallmarks of project excellence. Steve Bass, Supply Chain Director at Devon comments:

Collaboration has been underrated and unfairly ridiculed – look at the evidence –it produces the best results.

Best-In-Class Collaboration Results

Based on our analysis of 90 Canadian projects, we have assessed success rates of each type of construction model, indicated in Table 2 .

Table 2: Typical Success Rates	ADVERSARIAL Construction	TRANSACTIONAL Construction	COLLABORATIVE Construction
% chance of being delivered On-Time, On-Budget, On-Target	Under 10%	20-30%	80-100%

Collaborative Construction

Our estimates are supported by other research at the Construction Industry Institute at the University of Texas at Austin. Their research team examined those companies that were truly committed to a “partnering” relationship in construction projects. These “best in class” companies had a profound competitive advantage, as evidenced in Table 3: Collaborative Construction – Best-In-Class Results.

Cost	
Area	Results
Total Project Cost (TPC)	10% reduction
Construction Administration	24% reduction
Marketing	50% reduction
Engineering	\$10/hr reduction
Value Engineering	337% increase
Claims (%TPC)	87% reduction
Profitability	25% increase

Table 3: Collaborative Construction – Best-In-Class Results

Table 3: Collaborative Construction Results (continued)

Safety	
Area	Results
Hours without lost time accident	4 million vs. 48,000 industry standard
Lost Work Days	0 vs 6.8 industry standard
Number of Doctor Cases	74% Reduction
Safety Rating	Top 5% of National Average
Schedule	
Area	Results
Overall Project	20% reduction
Schedule Changes	48% reduction
Schedule Compliance	Increased from 85% to 100%
Employee Morale	
Area	Results
Employee Job Satisfaction	30% Increase
Claims	
Area	Results
Number of Claims	83% Reduction
Projects with Claims	68% Reduction
Quality	
Area	Results

Creating Value Starts with Commitment to the Values of Integrity & Fair Play

Gaining competitive advantage through collaborative relationship must start with senior leadership making a powerful commitment to building trust. Devon’s Steve Bass’ perspective:

Our philosophy is a “value delivery model” – it looks at total value with suppliers working together as a team, not just low cost. Productive supplier relationships are essential for value delivery to work.

Our Corporate Values are central to our supply chain; this means having integrity, being open, forthright and honest with our suppliers, and being committed to our mission and purpose – to have passion in improving our business and building trust with our suppliers.

Future Pathway for Industrial Mega-Project Delivery

COLLABORATIVE CONSTRUCTION – THE CLEAR CHOICE

Evaluating the Model for the Path Forward

Based on the preponderance of evidence from our analysis of highly successful construction projects in Canada, the U.S. and Australia, as well as evaluations from numerous other sources, we have concluded that only the Collaborative Construction model meets the criteria of:

1. Competitive Advantage: Creating the most sustainable competitive advantage

Key metrics for competitiveness are measured by ‘On Time, On Budget, On Target’ delivery or by cost effectiveness.

The collaborative model produces superior delivery of value to owners compared to current industry practices, because it intentionally aligns the interests of all the stakeholders. Because of the number of organizations that must be brought into alignment in a Mega Project, we term this approach the *Aligned Construction Enterprise (ACE)*. Simultaneously, this approach builds trustworthy teams and connects the delivery partners using strategic alliance best practices throughout the value chain. (The details of the model will be outlined later in this paper; see page 22)

2. Innovation/Adaptability: be adaptable to changing conditions and technologies while enabling continuous improvement and innovation

Key metrics for Innovation/Adaptability are reduction in scope changes and change orders by early engagement of key players in planning, speed of problem solving, innovative solutions that minimize delays and costs.

Risk in the mega project world is unpredictable, rapidly changing and fast moving. The idea “innovate or die” is the core of long term corporate sustainability. Innovation is needed at every level of the value creation chain, from inception to completion of the project delivery system. Today, because of the nature of complexity, integration and collaboration is essential in the development and delivery of innovation.

3. Productivity: be most productive and reduce non-value added work

Key metrics for Productivity include labour hours, reduction of non-value added work, fewer delays and breakdowns.

In a global market, continuous productivity improvement is the foundation of both competitiveness and profitability. Most organizations are filled with large amounts of Non-Value Added (NVA) work that result from years of distrust, silo

mentality, poor communications, and transactional handoffs. The productive organization focuses not on working harder, but working smarter using the *intellectual/creative capital* of its employees

Collaborative Construction must become the future delivery model for Mega Projects if Alberta is to stay competitive in the world marketplace.

Collaborative Construction

and alliance partners to streamline output. The most common methods of removal of NVA are Partnering, Lean Construction and Integrated Project Delivery (IPD). Evidence shows that these three methods are successful in highly *collaborative* cultures, but face strong resistance in *transactional* and *adversarial* environments.

4. Profitability: ensure that owners, engineering contractors, construction contractors, subcontractors, and suppliers earn a fair profit.

Key Metrics include achieving expected ROI, fair profit for all contractors and suppliers.

Earning a profit is one of the hallmarks of a successful business. Profitable performance provides maximum flexibility for allocation of the profits – to investors, to management, to employees, to contractors or reinvestment back into the business. For long-term sustainability, profitability must come not from quick-fix cost cutting, but from elimination of NVA work, productivity improvements, and innovation. Again, the evidence shows that profit for all the players in a construction project is enhanced when projects come in on time, on budget, and on target, which is most likely in a *collaborative* environment. (see Table 2: Typical Success Rates)

5. Engagement: fully engage its key stakeholders and workforce

Key metrics include greater employee morale, strong trust/teamwork culture, low job turnover.

Today most contractors and employees are not fully engaged in their work and expect to migrate from one job to the next on a regular basis. Not only does this produce poor productivity, but also high levels of employee turnover. Fully engaged contractors and employees are much more productive and are far less likely to seek out new employment. People work harder and smarter in a high-trust, high-teamwork environment where they find meaning and purpose in their work. This is supported by the data indicating much higher level of employee morale in collaborative work places (see Table 3: Collaborative Construction – Best-In-Class Results)

6. Environmentally sustainable and safe workplace: be safe and friendlier to the environment and the community

Key Metrics are no citations for violations, no lost work days due to injury, and awards for environmental responsibility.

The new future of project delivery cannot be exploitive of labor, pollute the environment, or undermine the community in which it lives. Rather, the future of Mega Projects must have a “soul,” a conscience, both a heartfelt and ethical connection to people and the world in which we live. Paying attention to environmental sustainability is much more difficult when projects are behind, everyone is angry and reactive, and it’s difficult to pay attention to factors that are not immediately critical.

Future Pathway for Industrial Mega-Project Delivery

7. Conflict Reduction: reduce the risks of conflict and turmoil

Key metrics include no law suits, few unanticipated breakdowns in project delivery, resolution of difficulties at the field level.

Collaborative Construction can be counted on to reduce the chances of wasteful conflict such as litigation, strikes, lack of proper skills, and failure to deliver which have plagued the industry in the past. It relies on using “relationship contracting” which is designed to be less litigious, resolve problems at early stages, anticipate difficulties before they turn sour, and negotiate/mediate conflicts before they escalate.

The Collaborative Construction model is the best form of project delivery and can consistently produce sustainable competitive advantage.

This model is also customer friendly, highly adaptable to change, engages its employees and contractors more successfully, and produces greater wealth for all the stakeholders.

In Collaborative Construction, many times sharing risks and rewards creates an alignment of interests, objectives, and operations.

Devon’s Steve Bass’ Tips and Insights

- *The legacy model of procurement is highly transactional (although there are times when it is appropriate, especially for commodity, off-the-shelf procurement). The collaborative model requires a lot more strategic work, technical development, building trustworthy relationships, and supplier development.*
- *Creating relationships is not new in the oil patch. It goes back to the beginning, when you’d shake hands on a deal. The difference today is to understand how to do it in the face of complexity and uncertainty and how to yield value from it.*
- *Doing business is more complex now, which requires a foundation of strong relationships built upon trust.*
- *Sharing risk and creating mutual value is a very successful formula for building trust.*
- *Both parties need to be putting something on the table that they wouldn’t have done before. Otherwise it’s just negotiating or a transaction.*
- *If it’s only a success for Devon, we’re likely to miss a lot in creating value for the project. Your partners need to succeed too. Without mutual success we just generate issues and claims at the back end.*

Without trust, teamwork is a delusion

Collaborative Construction

BACKGROUND ON COLLABORATIVE CONSTRUCTION

Working in a cooperative arrangement is not a new phenomenon. A century ago, the construction industry was much more informal and community based. All across Canada early settlers would join together to help a new family with barn raisings. Today senior managers often speak, with some lament, of the days in the 1960s when construction started with a handshake, contracts were short and frequently signed well into the project cycle, and law suits were virtually unheard of. Canadians brought their reputation for trust and integrity to bear to ensure everyone got their fair share. This heritage is not yet dead.

The evolution of Collaborative Construction has taken two parallel paths – “partnering” and “alliancing” -- dependent upon the size, risk and complexity of the project or program. In Figure 3: Risk & Complexity, we clarify the differences and show when each approach is most appropriate.

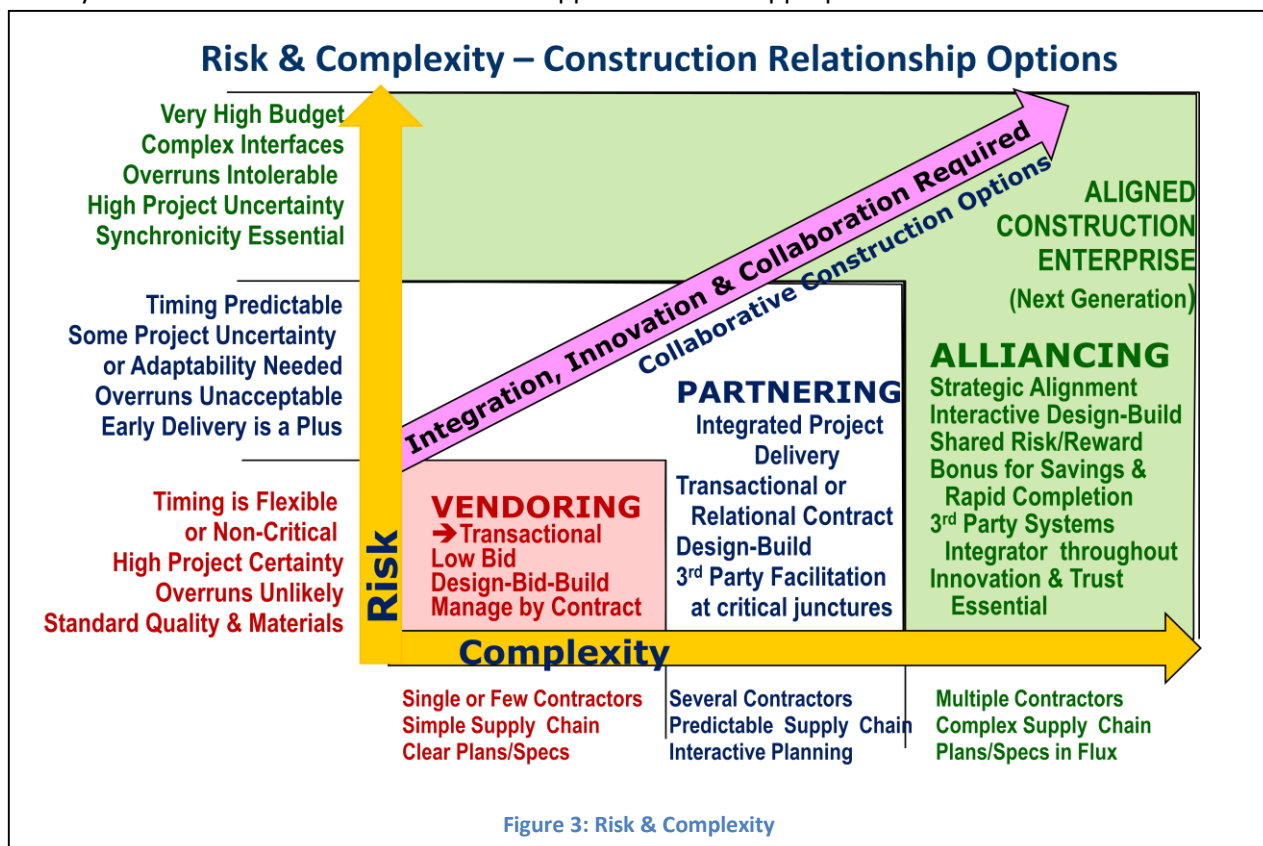


Figure 3: Risk & Complexity

Across Canada many commercial and infrastructure projects do utilize “partnering” approaches, often based on Integrated Project Delivery (IPD) methodology. For example, the Moose Jaw Hospital was built on schedule and 30% under budget using IPD. Many of the City of Calgary LRT and Interchanges projects were delivered on time and on budget without litigation using the partnering approach.

“Alliancing” has been used in the U.S. in commercial construction. North Sea oil drilling uses this approach. In Australia, the alliance methodology has been used with tremendous success, consistently bringing in hundreds of projects on time and on budget.

Future Pathway for Industrial Mega-Project Delivery

ALIGNED CONSTRUCTION ENTERPRISE – THE NEXT GENERATION

Need for Alignment & Integration

The authors, in conjunction with GO Productivity, have evolved the existing Collaborative Construction model with a full-scale set of best-practice methodologies which combines learnings, and the most productive and effective practices from the Canadian Partnering model, the Australian Alliance model, the Integrated Project Delivery model, and the global Strategic Alliances Professionals model⁷ to create a hybrid, ultra-high performance system, the *Aligned Construction Enterprise* (ACE). ACE is specifically designed to address the unique difficulties found in Industrial Mega Projects, which are typically plagued by budget and time over-runs due to misalignment and fragmentation. In virtually every study that analyzed the productivity difficulties in the construction industry, misalignment and fragmentation was cited as one of the most significant factors contributing to poor performance results. As discussed earlier, in *Systemic-Strategic Obstacles to Improvement*, authorities emphasize:

Unless the entire project team is completely *aligned* with the goals and objectives of the project, and all the players are *integrated* into a complete team, the problem of poor performance will continue. Attaining this alignment and integration has been a major problem. The roots of misalignment lie in the heart of how major projects are conceived at the beginning and executed at every milestone

*Lack of collaboration results in Isolation,
which breeds ignorance and arrogance,
spawning future failure.*

The more complex the project, the more collaboration required

⁷ The Canadian Partnering model is based on our extensive experience helping in the ninety construction projects which were characterized by the predominance of the adversarial and transactional models, we managed to move them with great success to more collaborative mode resulting in 90% success rate. The framework was tested mainly on construction projects including Light Rail Train (LRT) systems, highway interchanges, airport construction, roads and bridges, high rise buildings, hospitals and mega oil and gas facilities. In Australia, collaborative construction – called “alliancing” -- has been tried and tested in over 400 large scale construction projects with nearly 100% success. In collaborative environments, small to medium sized construction projects in North America have used as cooperative approaches such as “partnering” and “integrated project delivery” (IPD) with very high levels of success. The global Strategic Alliance Professionals model has been used world-wide and is annually improved by sharing of best practices by users in the field.

Collaborative Construction

In our earlier discussion of Leading Causes for Cost & Schedule Overruns, we analyzed the root causes of Mega Project difficulties, which are summarized here:

1. Unrealistic or overly optimistic original (AFE) cost estimate and schedules
2. Incomplete scope definition or inadequate Front End Loading/Planning
3. Inappropriate project strategies for the Mega Project environment
4. Mismanagement of the construction phase (which begins in conception and planning)

In response to industry's challenges, in this paper the authors are proposing a model for effective project delivery and innovation: *the Aligned Construction Enterprise (ACE)*. This ACE approach focuses on addressing large-scale construction projects from a "systems" perspective, starting with a holistic, three-dimensional view of the strategic, cultural, and operational issues at the outset. (see Figure 7: Three Dimensional Alignment, page 36) This includes:

- Getting the key stakeholders together to develop an aligned and focused mindset.
- Defining and forging common goals and objectives, developing plans for their achievement, and establishing working relationships through a mutually developed formal strategy of commitment and communication, endorsed by senior leadership.
- Creating an environment where open and honest communication, trust and teamwork foster a cooperative bond, and facilitate the successful completion of a project.
- Creating high performance teamwork and alignment mechanisms designed to sustain and expand collaboration over the course of the project, resulting in new value creation and great execution with high quality.
- Establishing formal alliance leadership teams for managing the ever-changing alignment issues.
- Discussing and resolving the nature of adversarial relationships and why they are counterproductive and should be avoided at all costs.
- Utilizing a 3rd party service integrator to keep the system aligned and integrated, and to provide critical core competencies that are traditionally missing in any of the key stakeholders.

Alignment Requires Early Engagement

Alignment cannot begin at groundbreaking – by then it's already too late; it starts with *early engagement of key partners*. Devon's success in Jackfish 3 relied on having key members of the development, supplier and construction teams sharing ideas, concerns, and recommendations from the inception:

It means getting everyone in alignment early – the internal departments such as engineering and the supplier partners and contractors – together doing front end planning together, getting their best people engaged early, providing insights and practical applications while we are defining material requirements.

Early engagement with our key supplier partners gives us a real competitive advantage. We have open discussions about risks and how to address them jointly. We all work together under a common model and problem solving method.

Owner Executives and key decision makers often lack experience in project management and project execution of complex major capital projects, which causes serious project execution issues. For example, a company that assigns a Mega Project to an Executive Vice President who has never managed a project in their career, the inevitable result will be massive and catastrophic. The more experienced people who can be brought in early on, the more likely a successful outcome.

Future Pathway for Industrial Mega-Project Delivery

The Service/Systems Integrator

In the situation of very complex engineering and construction projects (such as Mega Projects), ACE offers an accessible and simple approach to management to be delivered by the addition of a “service (or project systems) integrator & facilitator” cooperating and assisting the project team and the owner/investor’s organization(s) to provide critical support to the project delivery teams, especially in areas that are not traditionally the core competence of any of the delivery members.

The Service/Systems Integrator could be an independent project management coordination firm or project management office within the organization. The Service/Systems Integrator must possess sound understanding of mega project complexities and issues to be addressed and enable a “win” for all the stakeholders (owners, contractors, EPCs, employees, suppliers, and the public of Alberta). It also requires a clear mission for the project and support of the project management team and stakeholders.

The Service/Systems Integrator will also analyze the core competencies of the key stakeholders to determine if any skill sets are missing that could prevent achievement of objectives. Should critical competencies be needed, the service integrator will seek those skill sets and ensure they are imbedded into the project. Recognizing that collaborative skills are necessary for success, and that these skills can, for the most part, be trained, the service integrator will provide necessary team training and conduct regular “health checks” on the organizational climate to ensure trust, collaboration, and innovation is taking place on a regular basis.

Collaborative Construction

Critical Success Factors for the Service/Systems Integrator

The following section provides more background on the Service/Systems Integrator role and the critical success factors.

Mega Projects are highly complex systems requiring extraordinary levels of integration and innovation across the entire system. Because the different project components of the entire network are so highly compartmentalized, each, unless aligned, will naturally gravitate to maximize their own interests, not the interests of the project.

How should this integration and innovation be applied and managed? In smaller ventures, the integration can happen at the individual and group level. But in something as massive as a Mega Project, the integration and innovation functions need to be more formalized, managed, and systematically applied.

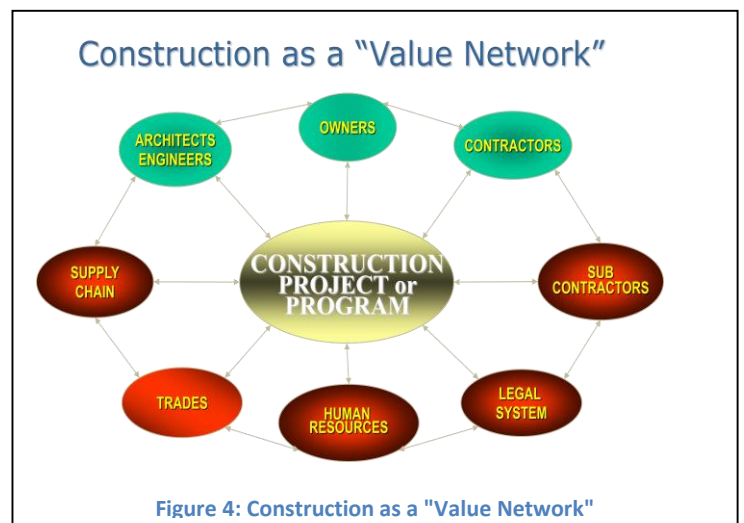
To use an example, Boeing is one of the largest aircraft manufacturers in the world. But they don't make the wings, or the landing gear, or the engines, or the seats, or the avionics. Boeing does not consider itself a manufacturer; they define themselves as a 'systems integrator,' who masters the design, development, contracting, assembly, testing, and selling. In other words, the 'systems integrator' connects all the elements of a value network (see **Error! Reference source not found.**), making sure all the points of value creation are maximizing their potential in unison and in synch.

Using another example, the human body is a highly complex, dynamic organism. One of the functions of the brain is to ensure each of the organs and appendages is doing its job in the right sequence and performance level. When one goes running or jogging, the heart and lungs respond by increasing the flow of blood and oxygen intake to meet the needs of running hard.

In the same vein, a highly complex system like a Mega Project needs a far more advanced systems integration function than one needed for smaller scale projects.

ACE Management Centre

Our proposed solution adds a new dimension to the alliance-based construction model by the creation of a 'Service/Systems Integrator' function imbedded in the middle of the value network. The System Integrator holds unique Best Practice core competencies that enable the organizations to function at maximum capacity. We call this Systems Integrator entity the Aligned Construction Enterprise (ACE) Management Centre. Below is a graphic presentation of this function (see Figure 5).



Future Pathway for Industrial Mega-Project Delivery

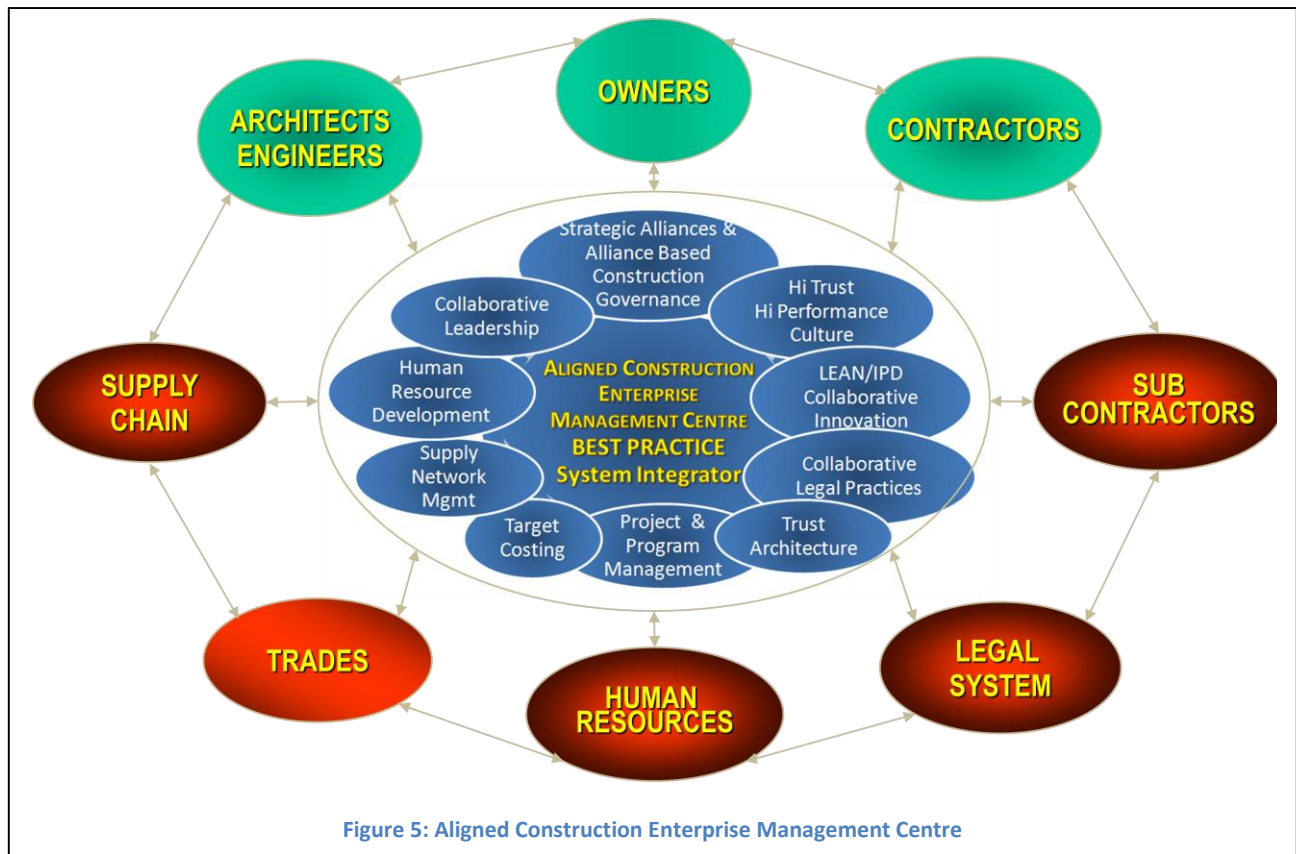


Figure 5: Aligned Construction Enterprise Management Centre

The core purpose of the ACE Management Centre is to implant, dead-centre in the middle of the delivery system, an entity imbued with best practices to link the pieces, plug the gaps, expedite the flow, anticipate problems, and keep the stakeholders in alignment. It will be responsible for solving the problems and creating the impetus for meeting /achieving the key success criteria, thus keeping the value network system in alignment.

The ACE Management Centre should be an organization that is jointly-owned and controlled by the Owners, Designers, and Contractors, who put up the money to for its staffing in proportion to the amount of reward they share in the venture. The reward for the joint-owners is that the Management Centre team’s value – producing on-time, on-budget results – far exceeds the costs of running the Centre. The ACE Management Centre’s task is to ensure that the whole is greater than the sum of the parts; that all players are winners; that the mechanisms for fast time, cost reduction and fair play are at work on the job site 24/7.

Staffing

The ACE Management Centre should be staffed by highly competent professionals assigned to help give the whole Mega Project a major uplift, injecting best practices and integrating the fragmented parts of the system to ensure high performance and high innovation. We foresee that the ACE Management Centre will be staffed by three professionals:

Collaborative Construction

1. Senior Alliance Leader who champions the ACE concept and sits on the ACE Leadership Team. This person should be a seasoned executive with a strong track record of success and capable of systems integration functions, alliance coordination, fast-time delivery, as well as having implemented Collaborative Innovation functions (using Target Costing, Value Stream Mapping, Partnering, Lean Construction, etc.) and be familiar with supply chain management.
2. Alliance Manager with field experience who crosses organizational boundaries, monitors flow, engages in early-identification of problems, ensures schedule, prevents break-downs in operations, and ensures communications across the network.
3. Human Resources Specialist to provide expertise to the ACE system in recruiting, hiring, training, placement, career-pathing, retention, labour relations, morale, personal recognition, and teamwork.
4. Adjunct members (part-time on an as needed basis) for:
 - a. data management linking suppliers, buyers, engineers, and other providers,
 - b. community involvement/benefit with public engagement and trust building ,
 - c. systems “health diagnosis” to spot problems before a crisis,
 - d. legal assistance/advice in relationship-based, trust building contracting processes.

Note: The ACE model *avoids* the Design-Bid-Build strategy (which often becomes adversarial). There are three key aspects to ensuring a high quality, results-oriented project delivery team:

1. A high performance Design & Construction Team is pre-selected based on integrity, quality, fast-time delivery, and collaborative innovation skills.
2. Instead of bidding on designs, the Design & Construction Team uses “Target Costing Estimates” with Guaranteed Maximum (based on typical ‘Business as Usual’ costs) to devise faster schedules and even lower than normal/expected costs.
3. Then the team sets out to break the targets, and is incentivized to innovate and break-through further.

Key Principle: Sharing Expands Possibilities, Hording Contracts

Matt Knight, Managing Director, Productivity Growth Services, GO Productivity observes:

A win-win scenario starts with sharing a lot more information, opening up and putting your cards on the table.

While it takes time, sharing information will increase accuracy in planning and scheduling, and the supplier won't have change orders at the end of the project. It increases efficiencies during the execution of the project.

Future Pathway for Industrial Mega-Project Delivery

Critical Success Factors: Foundation of the Aligned Construction Enterprise

From our experience studying and building high performance alliances and teams across Canada and in the United States, we have found several over-riding factors that produce success:

- 1) Complete Value Chain/Network Strategy
- 2) Senior Executive Commitment
- 3) Trust, Teamwork, & Innovation as the Central Organizing Principles
- 4) Rigorous/disciplined use of Best Practices
- 5) Allocation of High Performance People
- 6) Careful Selection of the Delivery Team
- 7) Focus on Schedule

We will examine each in detail:

1. Complete Value Chain/Network Strategy:

High performance organizations start with highly collaborative strategies for engaging all parts of their value chain – internal and external. Their competitiveness against external rivals/risks is derived from the cooperativeness within the value chain. This value chain alignment and integration is founded on tight linkages between organizations using the best practice architecture of strategic alliances. When the *transactional* interfaces are replaced by *collaboration, teamwork and trust*, the value chain “morphs” into a network.

Strategic Alliances: To optimize the power of value chain integration, the Aligned Construction Enterprise model utilizes strategic alliances to link and align each organizational entity that plays a key role in the project delivery system. The difference between success and failure lies not only in the existence of these alliances, but in their form, application, and integration. This process brings both stark simplicity and higher performance potential.

From Supply Chains to Value Networks

The idea of ‘supply chains’ evolved from the transactional exchange of goods for money between companies. However, when supply chains are integrated and when independent suppliers are provided with a trustworthy relationship they begin sharing ideas interactively.

Matt Knight at GO Productivity refers to this transformation as a “value network”. It describes a system of partners who share similar values and business strategies and are committed to working together to achieve a thoroughly discussed goal.” He says it “works faster, is far more innovative, and thus it creates a major competitive advantage over slower chains.”

But he maintains the standard RFP (Request for Proposal) process is severely limiting, “The whole RFP process is broken; it doesn’t build trust, nor does it encourage innovation flow.” Once we integrate suppliers in a collaborative network, we establish an environment that can grow new value.

When you know your requirements, you interview supplier partners and say, ‘Here’s our vision and here’s our commitment to you,’ so it’s a mutual commitment over time to sharing risk and rewards.”

It increases efficiencies during the execution of the project.”

Collaborative Construction

Strategic Alliances, as the name implies, tend to be aimed at impacting delivery partners at both the strategic and tactical levels. While alliances have been around a long time, in the last 20 years the alliance profession has deeply codified the organizational architecture of best practices that create repeated success. In the construction industry, alliances have formed the bond that's produced remarkable results in Canada, the U.S. and Australia. The best practice methodology of alliances is quite effective, producing 70-80% success rates or better.

(Note: the ACE model is a more systematic and thoroughly integrated approach better used in large scale Mega Projects, but nevertheless similar in philosophy and objectives to other partnering approaches like Integrated Project Delivery (IPD). Many collaborations outside the construction industry have produced billions of dollars of value for companies like IBM, P&G, and the airline industry such as the Star Alliance, among numerous other smaller companies.)

While many businesses have successfully embraced alliances, the issues of control and trust still worries many executives. However, when using best practice architectures to form, align, and manage alliances, the control issues are replaced by highly synergistic leadership and governance. In the end, collaboration and integration continually beats distrust and fragmentation in the creation of competitive advantage for those making the partnering decision. What gives the alliance architecture power is four-fold:

Safety is Designed into the Project from Inception

The Devon Team spent time creating a system resulting in on-time, on-budget, zero injuries, according to Steve Bass:

We've had a spotless safety record because we first aligned through values, then we made a strong commitment to safety, innovation, joint processes, data sharing, and training.

First, alliances embrace a *holistic/systematic* framework that sees the production of value from a multi-layered input-output perspective. This holistic approach starts with critical *alignments*: 1) strategic impact, 2) examines inter-relationships between cultures and the development of trust, then 3) tackles the issues of operational performance. (This is often referred to as *3-Dimensional Fit*; more detail later) Fair dealing, equitable sharing of risks and rewards, and adaptability to change are fundamental alliance issues.

Second, alliances establish a formal *governance structure* that enables the multiple partners to make adjustments in real time. The governance structure enables alliance leaders and senior executive sponsors to address immediate problems, allocate priorities and resources, and ensure high trust partner relationships.

Because Mega Projects constitute a very unique and complex construction environment beset by a multitude of problems, we foresee the establishment of an additional governance and alignment mechanism – a *coordinator, facilitator* and *integrator* that provides the missing pieces that none of the typical participants provide. This *Service/Systems Integrator (SSI)* can be an independent project management consulting firm, an at-risk partner (such as a construction management firm) or a project management office within the owner organization. During the project formation stage, the SSI facilitates bringing together and alignment of the key delivery partners. Next, during the operational phase, the SSI provides coordination, anticipation of problems,

Future Pathway for Industrial Mega-Project Delivery

and critical services that none of the partners have core competencies to provide (but typically cause projects to fail in the end). The Service/Systems Integrator must possess sound understanding of Mega Project complexities and issues to be addressed. The SSI also serves as a mediator should difficulties arise, thus resolving disputes before they become entanglements.

Third, the more mature alliances, because of their *collaborative* culture, also tend to evolve as *engines of innovation* as the dynamic differential energy of unique cultures link together in a manner that produces collaborative innovation. The longer companies work together successfully, the more likely they are to innovate together in new ways.

Fourth, the alliance framework calls for a *shared risk – shared reward* approach to incentivizing the stakeholders. The owner sets aside a substantial reward that is fairly allocated and distributed to stakeholders when project milestones are met. The structure of the reward system only puts profit and overhead at risk, without jeopardizing direct expenses.

Alliances provide a strong strategic framework, excellent and systematic practices, and a collaborative and ethical methodology for conducting business in general and Mega Projects in particular.

2. **Senior Executive Commitment:** The use of the Aligned Construction Enterprise is a major change in mindsets, culture, and operational functionality. In other words, this type of initiative implies a significant multi-organizational transformation effort. It cannot be successful unless the senior leaders of each of the essential stakeholders are fully committed and engaged.

Implementation will trigger resistance to change, which at times can be daunting. Unless senior executives are willing to provide leadership, encouragement, guidance, and rewards, there will be no path to success.

Senior Executive *commitment* is not enough, unless it embraces a powerful *understanding of collaborative project management fundamentals*, which are highly interactive and based on building a system of trust, teamwork, and innovation to handle complexity.

Collaborative Construction Requires Strong Leadership

Especially for companies that have had a long history of engaging with suppliers and contractors *transactionally* or *adversarially*, making the shift to collaboration may be difficult. Senior leaders must be united in their resolve to stay on course. For Devon Canada Corporation, the shift evolved over three Jackfish projects. Steve Bass observes:

A collaborative strategy needs dedication by leaders at the top, middle, and bottom of our organization. Leadership stepped up to make a major difference.

Being a leader means you are doing something different, something better – not the same thing that had failed before.

We needed a strong, collaborative vehicle for change to enable us and our partners to move past being transactional, past the adversarial blame game, into genuine joint problem solving.

Collaborative Construction

3. **Trust, Teamwork, & Innovation as Central Organizing Principles:** ACE is a not just a change in construction delivery methodology; it is also a “cultural change,” which traditionally is not an easy adjustment, particularly for older, “seasoned” managers who may have had to adopt the mindsets of the ingrained *adversarial* and *transactional* models of construction.

However, cultural change is not necessarily as difficult as it is often made out to be. If senior leadership makes trust, teamwork, and innovation the three “central organizing principles” of the new culture, and then aligns performance measures and rewards systems to support these principles, then the cultural shift can often be successfully attained in as little as several months.

High performance organizations that sustain their advantage over the long term place great value on their people and project teams. In particular, they emphasize 1) trust, 2) teamwork, and 3) collaborative innovation, always pushing the envelope with new ways to work together to produce more value for their customers, their company, and their alliance partners. Let’s examine these three factors: (see Figure 6)

- Trust is the essential behavioral foundation of all collaborative enterprise. Without trust, collaborative strategies, collaborative innovation, and collaborative execution (teamwork) is difficult, if not impossible. We have developed highly effective trust architectures that embrace the interpersonal roots of human behavior, as well as the operational and economic issues that support, sustain, and rebuild trust.
- Collaborative Innovation is the source code for all companies that exist in highly competitive environments where the onslaught of continuous improvement must prevail. Collaborative Innovation enables companies to be regenerative – to transcend their past and reinvent their futures. Collaboration is necessary to unleash the collective creative potential of people on the project. Collaboration occurs on a foundation of trust and empowers the team to work together. When provided

Devon’s Commitment to Building Trust

Trust is the foundation of all collaborative enterprise. Here’s what Steve Bass at Devon says:

If we’re good at collaborating and do it right, we create trusting relationships.If we stand by the values we’ve agreed to stand by, trust develops.....earned by dealing with difficulties fairly along the way.

You have to say what you’re going to do and do what you say. Be consistent with behaviours and values. We hold each other accountable in a collaborative relationship. The traditional model of buying and contracting, holding you liable—and maybe suing you—is an arm’s-length, even adversarial, style.



Collaborative innovation is the cornerstone of success for the future of construction

Future Pathway for Industrial Mega-Project Delivery

with the right collaborative innovation architecture, the team becomes highly innovative, creative, and insightful in solving problems and utilizing resources in very efficient ways.

- Teamwork is the coordinated effort through which high performance organizations deliver their value. Without teamwork, value can only be *transactional* at best. Most think of teamwork as primarily an internal function; this is an over-simplification. Teamwork is just as important externally with suppliers, delivery partners, and customers; the external collaborative teams are called “strategic alliances.”

Great teamwork has a dual meaning: teams that work internally (within their own organizations) are highly productive and enjoy their work; teams that work externally (outside their own organizations in alliances with others), provide excellent coordination, cross-boundary problem solving, and fresh ideas for new ways to work together more effectively.

But if leaders don’t pay attention to these factors, the consequences are usually mediocrity or failure. The most critical element that’s so often missed is to be sure the *measures* of performance and *rewards* systems are realigned to support the new *collaborative* culture. In the ACE model, a reward system is established for all stakeholders to incentivize on-time, on-budget delivery of a quality result.

Case Example – A Failure to Innovate

In an atmosphere of intense distrust, systems fragmentation, bureaucratic control, and adversarial contracts, collaborative innovation withers and dies. Innovative solutions never see the light of day, buried in the trash-heap of fear.

For example, in one recent Mega Project, in an effort to stay on schedule, one contractor recognized the approach to lifting a 900 tonne reactor typically required a specialty crane which needed to be pre-ordered years in advance, costing several million dollars.

Faced with an inflexible and aggressive schedule, a senior Construction Manager suggested modifying the design of the reactor support structure so that the reactor could be jacked in place, eliminating the need for the specialty crane, reducing both cost and time.

While the idea was sound, and in the best interests of the project, in a poisoned atmosphere of distrust the engineers saw the suggestion as a threat to their competency, and the Project Control team saw it as a change in specs, suspicious that the Construction Manager was trying to pad his profits.

Needless to say the idea was squelched, and the Construction Manager ended his efforts at innovation.

4. **Rigorous/disciplined use of Best Practices:**

One great advantage of the ACE model is that it is a hybrid that carefully utilizes the best practices of several different collaborative construction models, integrating them into one system that significantly increases the chances of success. Over the last twenty years the alliance profession has consistently found that the rigorous use of best practices will double or triple the success rate.⁸

A “Best Practice” contributes to achieving one or more of the three gold standards for Project Execution: 1) on time and 2) on schedule (or better) with 3) 100% safety.

Doing something everyone else does but doing it incorrectly is not best practice.

Best Practices make a measurable difference in the outcome.

Best practices address not just the day-to-day operational aspects of alliances, but also the strategic alignment, governance, team and trust building, problem/issue resolution, systems integration, safety, and innovation/transformation aspects of the project or program.

Current ‘best practice’ is to collect lessons learned in a data base. Sadly, this seldom works. The lessons are mostly nonsense as they fail to address the real root causes. Too often technical experts don’t address the human factors, such as trust, poor integration, and adversarial business practices that underlie the root causes. Thus the lessons learned are superficial and the real problems get blindly reinvented in the next project.

5. **High Performance People:** Collaborative Construction relies heavily on the quality of the people and their commitment to performance. This is not a “soft” program that is easy on people. It requires hard-charging, trustworthy people who like to excel and work well in teams. It is not for lone-rangers, lonesome heroes, and people who lack the interpersonal skills to work together.

Some people are intensely “action-oriented,” itching to get to work right away, thinking that this is the pathway to rapid completion. While this may be effective in simple projects, in the arena of complex Mega Projects, wisdom dictates the use of insight, planning, and anticipation/solving of problems before they have the chance to become catastrophic. This requires a high performance team that is willing to engage in up-front joint planning and can see a task and all its steps, twists, and turns, all the way to completion before beginning. People who know the right question to ask are often far more valuable than those who think they already know the right answer, only to find out that someone else had critical information that would have avoided difficulties if only someone had asked.

6. **Careful Selection of the Delivery Team:** Prequalification of engineering, contracting, and supplying companies is a critical factor for success in the Collaborative Construction model. The focus is on selecting delivery team members who are not just competent, but also capable of high

⁸ From studies conducted by the authors, and the Association of Strategic Alliance Professionals (see www.Strategic-Alliances.org)

Future Pathway for Industrial Mega-Project Delivery

performance, innovation, and teamwork. Because trust is the glue that holds the delivery team together, only those with high character and integrity can be allowed to bid and deliver.

While cost is always a factor, this is balanced with other key considerations such as a history of delivering on time, a track record of little or no disputes and litigation, strong customer satisfaction and repeat business, aptitude for innovation, positive working relationships with subcontractors, and the ability to retain quality personnel who will assigned to and remain on the job. Recognizing that no supplier or contractor is perfect, there must be a commitment to developing their capabilities to perform throughout the development and delivery cycle.

Local versus Global Labour Market Dynamics & High Performance People

The local employment market is volatile. Private construction firms go to great lengths to retain key people by keeping growth at manageable levels. On the other hand, publicly traded firms get punished by Wall Street if they don't show backlog and growth, driving a 'win the work and sort it out later' behaviour. Owners resist paying out of town personnel higher wages looking for local Alberta construction personnel. These local pressures means the number of personnel in the local pool is constantly shifting among companies that win the work as they bid against each other for labour to work on a project-by-project basis, not as long-term members of a high performance innovation team.

We have seen companies who don't have a high regard for their employees suffer epidemic rates of turnover has high as 85% annually. This causes massive productivity and quality problems in the field, which contributes significantly to overruns on Mega Projects that require world class quality personnel.

Evidence shows, however, that companies with highly *collaborative* cultures have a far more stable workforce. Why?

Economist John Helliwell of the University of British Columbia has shown that Canadians and Americans see just a 10% increase in their sense of trust in their work environment is equal to a 40% raise in pay.

In other words, leaders that make trust and high performance teamwork a centerpiece of their business are far less prone to employee turnover than their *transactional* counterparts who see their workforce as "replaceable parts."

7. **Focus on Schedule:** On oil sands Mega Projects, Owner companies should emphasize schedule over cost. Low cost is elusive and a delusion if the project sustains substantial and cumulative changes, and fails to ensure effective overall integration.

Falling behind schedule ruins all ROI projections for Investors, which can be ruinous when the price of oil fluctuates wildly

For oil sands Mega Projects, the total, all-in cost (including lost production) of falling behind schedule can be as high as a \$1 million per hour. Therefore, project planning and execution needs to make staying on (or beating) schedule paramount for everyone, from the project managers, to the contractors, to the labour force, to the supply chain.

Collaborative Construction

Project teams need to understand the business case and particularly: the key factors enable and support the business case, how the facilities will start up, how they will be constructed and turned over to support start up, and the schedule needed for Engineering and Procurement to efficiently support the Project Execution Plan. Schedule always needs to be determined before cost can be determined.

Experience has shown that low-cost bidders all-too-often deliver poor quality, have problems retaining quality employees, and seldom deliver on time. A good pre-qualification process can avoid these difficulties.

Devon's Commitment to Excellence

Devon's success meant going beyond transactional thinking. Steve Bass comments:

Devon employees made a real commitment to mentoring local contractors doing business on the Jackfish 3 project. They helped suppliers set up systems and paperwork, coached them on logistics, construction and project management, and trained them in environment, health and safety requirements. Sometimes the suppliers ran into problems; we were there to help them, not to blame them.

The result? Jackfish 3 is a great success for local communities, whose people have now proven to be commercially successful and have developed a robust workforce. It's very rewarding.

What's crucial is the interplay between companies:

The integrated supply chain brings the partners together and creates the understanding of how we're going to succeed in this project.

Shifting Mindsets

Implementing the ACE model entails a considerable up-front investment in time and resources to bring the right people into the process, to transcend typical industry mindsets, and to forge a common team identity among stakeholders from different organizations in the delivery chain. (Depending on the nature of the project and the type of contractual arrangement, the number of organizations involved, and their prior experience working together, the process can have a variety of different shapes and forms.)

Nothing significant will happen without a shift in industry mind set. Changing people's perceptions about collaborative strategies for doing business will require a shift in thinking and perceptions around the world. Successful organizational transformation requires the complete integration and alignment of strategic

Future Pathway for Industrial Mega-Project Delivery

advantage, human behavior, and high performance operations into its project delivery systems. The shift in thinking can be done considering the dimensions illustrated in Figure 7 – Three Dimensional Alignment.

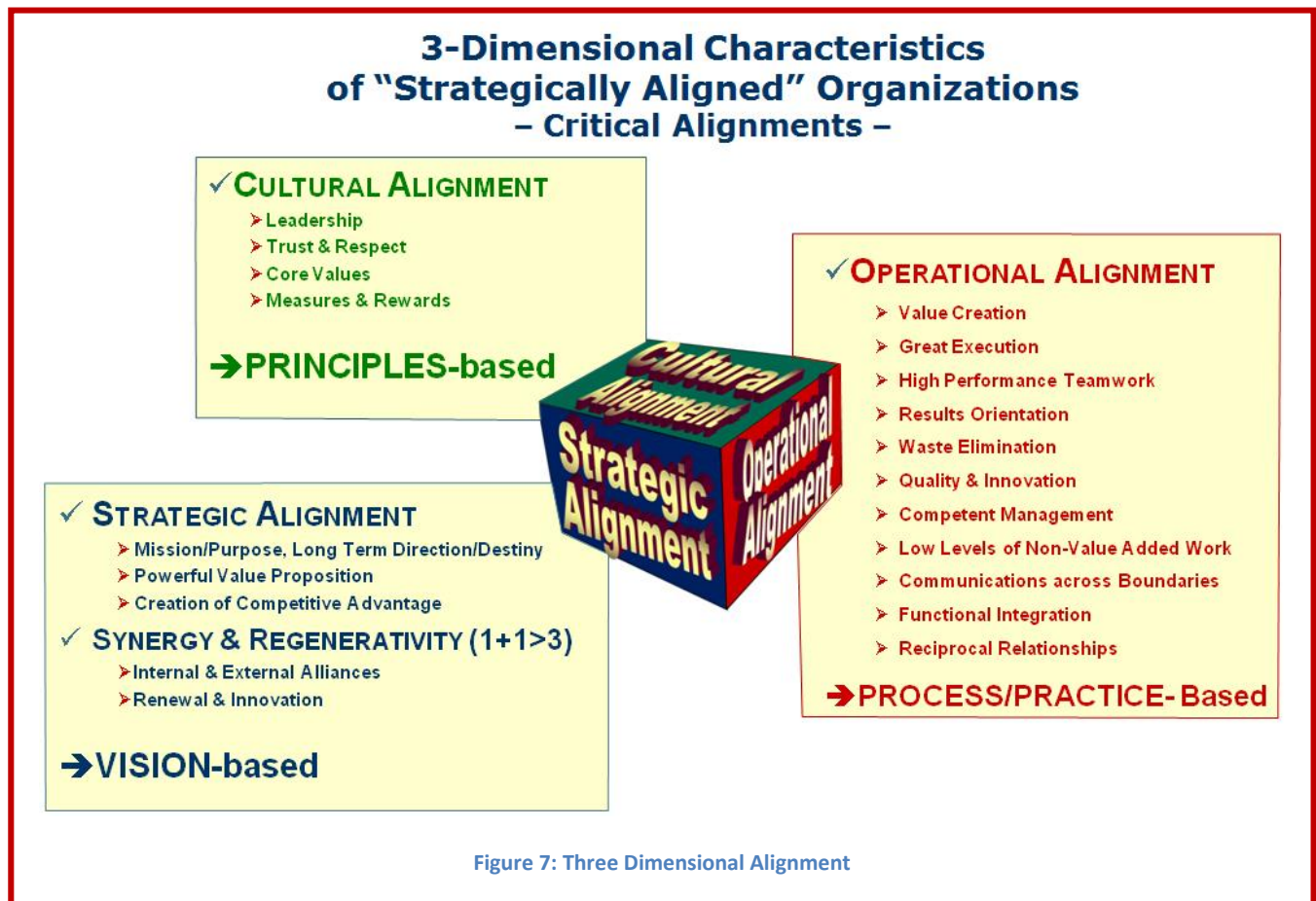


Figure 7: Three Dimensional Alignment

We will explore these three dimensions in more detail:

1. **Strategic Drivers** refers to the competitive forces that push the stakeholders and partners to think and act in a manner that collectively creates Competitive Advantage. The alignment of Strategic Drivers ensures the cast of characters are working in the same direction and understand the fundamental meaning and purpose the owner has in mind. If and when the Strategic Drivers change, the entire alliance must now adjust to stay in tune. This is a “vision-based” activity, and project management tools such as project charter, goals and objectives, project execution plan are useful to align the Strategic Drivers.
2. **Culture of Positive Human Interactions** creates great chemistry among people. Culture determines what is “top of mind” and highly valued by leaders. The alignment of the culture ensures that critical issues like trust, decision making, communications, leadership styles, values, protocols, and reward systems are compatible so that people can work together in teams, and create together to innovate and solve problems rapidly without blame and discord. This approach is based on mutually acceptable “core principles,” as well as the use of basic partnering tools and methodologies (such as the application of periodic “health checks,” issue resolution mechanisms, operating ground rules, and clarity of roles and responsibilities).

Collaborative Construction

3. **Operational Functions** address key actions that must produce extraordinary results. Operational alignment means that the human delivery systems and the mechanical functions can be implemented in the field in a highly effective manner. This is “process & practice” based. It addresses using the most effective methods and tools such as construction methods, productivity improvements, quality improvements, lean management, value engineering, constructability, and other value improving practice and best practices.

It is important to understand from the outset that the three dimensional alignment creates long-term success because it is holistic approach to doing business and delivering projects. Supporting these three dimensions requires a compatible cast of legal/contractual/financial methods and procedural instruments, as well as a fair and effective means of governance. Some of the most effective means for success include:

- Fair and balanced contract terms and conditions with a joint operating covenant
- Profit /risk/ reward sharing, fairly apportioned to align the interests of the stakeholders
- Proper use of contract types and payment structure such as the Construction Management model with lump sum contracting.
- Open Book Management with contractors (which is easily supported in a high-trust culture).⁹

In the past decade, in an effort to rein-in galloping overruns, Producers have unsuccessfully created massive project management organizations staffed with large numbers of Project Control personnel. This has created a bureaucratic regime that does nothing to speed the flow of value among the delivery partners; large Producer Project Control teams have instituted overwhelming reporting requirements that add little value, drive up costs, and cloud real issues from being identified.

On the other hand, successful project delivery understands that greater control is derived from *cooperation: systems alignment, joint problem solving, early engagement, and high performance teamwork, not Draconian punishment.*

Trust Reduces Risk

Collaboration is both a trust mitigator and a reward enhancer. Here's how Devon's Steve Bass views risk:

Sharing risk and creating value together helps build trust. When solutions are created collaboratively, it lowers our risk

We cannot be caught in a blame game. That just increases the risks. We need to work as a team in the supply chain; a team in the development phase, and a team in the project rollout – we work like a network. That helps them recruit and retain a highly skilled labour force, which helps reduce our exposure to risks

If we can find partners for the long-term journey, we can create something special. We can manage risk together, share learnings, knowledge and observations of what's going on in the marketplace. That can yield a truly rewarding relationship.

⁹ Open Book Management does scare a lot of people who do not have a solid trust foundation in their organization; in our experience, Open Book Management is much easier to accept when the partners acknowledge and accept a “target profit margin” that each is allowed to achieve through mutual cooperation and joint cost reduction.

Future Pathway for Industrial Mega-Project Delivery

Myopic versus Holistic Risk Management

The fast track nature of major industrial projects, combined with rapidly evolving new technologies, and complexities not easily perceived at conception always results in major and multiple scope changes during execution phase. These risks must be fairly factored into the operating agreement, not thrown mercilessly and adversarially into contracts kill trust, turn allies into enemies, and doom the project to finger pointing, poor coordination, and ultimately litigation.

It is not a coincidence that the idea of “team/alliance culture” seems to be in the vocabulary only of those leaders who advocate *collaborative* construction, but is tragically *absent* from the mind-set of those who engage in *adversarial* or *transactional* practices.

Collaborative leaders understand something their *adversarial* and *transactional* counterparts fail to grasp: *culture risks* may be the biggest risks of all -- a risk that is amplified and magnified with increasing complexity of the project.

Failure to put a high trust/ teamwork culture in place triggers massive risks which include: grievances, sabotage, labor strikes, employee disengagement, absenteeism, employee turnover, disengagement, non-value added work or value destruction, poor communications and coordination, low performance and productivity, silo mentality, lack of innovation, and slow speed – all leading to project overruns and schedule breakdowns.

The Most Important Thing for Leaders to Know

Virtually all definitions of leadership speak about influencing behavior. What every leader must know is that leaders, more than anything else, create the culture that draws forth or suppresses good or bad, wanted or unwanted behavior. Leaders can influence behavior if they understand what drives behavior.

At the outset of any transformation process, leadership must make a distinct decision as to the type of culture to be deployed: *adversarial*, *transactional*, or *collaborative* – which define the type and style of how the “game” of business is played. This factor is often overlooked, with dire consequences; all-too-often the choice of the “game” is a crude mixture of all three approaches, which “grinds the gears” and divides an organization against itself. For example, if the transformation intends to create more teamwork internally (*collaborative*), but beats up suppliers (*adversarial*), while showing little care and service for customers (*transactional*), managers and employees will be thoroughly confused as core values become disjointed.

Leadership Drives Culture which Drives Behavior

The primary way culture is developed, unified, and sustained in any organization is through leadership. Thus one of the first tasks of a senior executive is to understand/experience how collaborative construction operates and to align the senior leadership team and middle management into a coherent collaborative unit that promotes working together by:

Collaborative Construction

1. Determining the Core Beliefs of senior leaders (see Table 1: Spectrum of Three Competing Models of Project Delivery & Their Characteristics), then replacing any senior leaders that are committed to *adversarial* or *transactional* thinking. This builds unity in the organization, teamwork across the board, and trust in the workforce. It takes a tough leader to decide who makes the cut.
2. Developing a set of High Performance Values, Metrics, & Rewards that support a collaborative culture. Then live by these, don't just give them lip service.
3. Establishing Core Operating Principles that guide trustworthy interaction between people, teams, cross-boundary/functional units, and external alliances.
4. Making Collaborative Innovation the source of co-creative energy, adaptation to changing environments, and competitive advantage in meeting emerging customer needs.
5. Ultimately making trust, innovation, and teamwork the three "central organizing principles" of high performance, high profitability, and high sustainability.

CONCLUSIONS

The delivery of Mega Industrial Projects is at a critical cross-roads – at the edge of an evolutionary shift. Productivity is down, and in many regions contractors are experiencing labour shortages. Study after study shows the industry is misaligned and fragmented, with layers of non-value added work in the system.

With all the study devoted to analyzing the problem, why has the construction industry been so impervious to change? – the competitive bidding process, designed over a century ago for small scale projects, implodes in the stratosphere of the Mega Project. Just trying to win the work and execute for the proposed price and schedule is difficult enough, leaving no time nor trust to fast-track the project using collaboration, innovation, and early engagement

To resolve the problem we must step back from our day-to-day view of the world, and see the construction industry in perspective. It is often plagued with a toxic concoction of *adversarial* and *transactional* mindsets and practices that cause inordinate delays and unprofitable conflicts. It is time to change to a model that consistently works. Owners, investors, operators, contractors, engineers, supply chain managers, and project managers must grasp the significance of the urgency to shift to a Collaborative Construction model.

In our study of, and experience with, highly successful construction projects, we have developed the Aligned Construction Enterprise (ACE) model. It is an evolutionary product of research, best practices and implementation of major projects in Canada, North America, Australia, and other industries that promises to:

- Bring key stakeholders together to develop an *aligned value flow* and focused collaborative mindset.
- Define common goals and objectives, and develop joint plans for achievement.
- Directly address the counter-productive nature of adversarial relationships and why they must be avoided at all costs.
- Encourage openness, fairness, integrity, and honest respectful communication as a foundation for trust.

Future Pathway for Industrial Mega-Project Delivery

- Build high performance teams and alliances that produce on-time, on-budget, on-target project delivery.

In our many years of building and studying high performance project teams and organizations, there are several over-riding conclusions:

1. High Performance organizations start with highly collaborative strategies to engage all parts of their value chain – internal and external in a collaborative way – which transforms the value chain into a value network. Their competitiveness against external rivals is derived from the cooperativeness within their value network.
2. High Performance organizations and projects that sustain their advantage over the long term place great value on their people, culture, and the drivers of human behavior. In particular, they emphasize trust, collaborative innovation, issue resolution, and teamwork, always pushing the envelope with new ways to work together to produce more value for their customers, their company, and their partners.
3. Leadership is the primary means of affecting the mindset and cultural shifts in any organization. This is why *leadership is more important than management*, and maybe more important than anything else. Creating a “movement” toward a Collaborative Construction model requires unified thought leadership of those who truly believe in the power of *collaborative* strategies to outperform *transactional* and *adversarial* strategies. Highly collaborative companies are high trust companies. These companies, in country after country, and within industry after industry, consistently outperform their competitors.

Launching collaborative construction in Mega Projects can start by leading edge organizations, thought leaders, and business owners beginning with pilot projects, while staking out a new vision and era to share, promote, and reinforce lessons learned and best practices. Canada is one of the most trusted nations in the world; we need to use our inherent trustworthiness as a capital asset.

Shifting to a Collaborative Construction model is essential to make more than just the numbers work.

The future of Alberta is at stake.

We can either lead the way with a bold new approach or we can become obsolete as others innovate and transform the industry around us.

But it takes a who new level of thinking. As Einstein advised, we cannot solve problems with the same level of thinking that created the problem, otherwise we risk doing the same thing over and over again, expecting a different result.

The future is beheld by those who create it.