

# Embracing Complexity

PRODUCTIVITY ALBERTA'S OPTIONS FOR INFLUENCING HEAVY INDUSTRIAL PRODUCTIVITY

# 1 INTRODUCTION

## 1.1 Productivity predicament

Productivity is a major challenge in Alberta. It is chronically low. The problem is most acute in construction.

From 2005 to 2010, average labour productivity fell 22 per cent. Comparatively, over the same period, oil and gas showed an increase of one per cent. Both sectors are voracious employers, but they perform very differently.

A key driver is energy's willingness (and ability) to pay high rates for labour and growth. In oil and gas, the average hourly earnings are more than double those paid in construction. When demand for labour in oil and gas rises, construction gets robbed of skilled labour. Construction is constantly training new recruits. Bottom line: productivity plummets.

These dynamics collide when energy operations expand. Expanding energy operations come face-to-face with the labour crisis they cause. Construction costs skyrocket, schedule overruns multiply, and production certainty disappears.

System-wide solutions are not obvious. Construction itself is not a homogenous sector. Heavy industrial, commercial and residential construction are very different from each other. The best practices of one do not necessarily apply to the others.

The complexity of productivity is further muddied by a metrics gap. Executives do not trust the usual measures. Without clear evidence, productivity issues go unaddressed. Supply chains remain inefficient.

Of course, challenges are opportunities. And these opportunities are big. Combined, oil and gas and construction represent 24 per cent of Alberta's economy (they join finance and real estate (17%) to comprise the top three sectors). The huge success of these industries forces continuous forward motion.

Scattered in their wake are wide range of options for improvement. While executives tell us that they must stumble on, they agree that someone needs to pick up the pieces.

## 1.2 Context of analysis

Nothing we said above is a surprise. The issues are well known. But some of the dynamics that influence decision-makers are changing.

- The 2008-09 dive in oil prices scared executives. From 2003 to 2008, the price of oil rose steadily. In 2009 it was cut in half. The volatility wiped out margins and much of the complacency around productivity.
- Thin margins drove aggressive reviews of planned projects and investors are leery of development proposals. Performance is a key success factor. And productivity is rising as an important metric.
- Even where productivity is not top of mind, skilled labour is. The two are connected. Increasing productivity means fewer people are needed.

Fortunately, a lot of work is already in hand:

- The Construction Owners Association of Alberta (COAA) completed a series of project assessments in 2008<sup>1</sup>. It is a robust analysis and presents a wide range of benchmarking data.
- This information was further supplemented from 2009 to 2010 by CII<sup>2</sup>.
- In 2011 the COAA issued a position paper, “Heavy Industrial Construction and Maintenance Workforce Challenges in Alberta<sup>3</sup>.” In the paper they called on companies to commit to implementation of the best practices it identifies. It also recommended the creation of a long-term vision (to 2025) and improved supply/demand forecasts for skilled trades.
- The 2011 position paper was supplemented by the COAA in 2012. “Background Information for COAA Position Paper: Productivity and challenges in Alberta<sup>4</sup>” is a summary of six research papers and industry reports.

Yet, in spite of all this data, many of the most obvious best practices it identifies are not adopted. Why?

This project is about identifying specific reasons for lagging adoption and, more importantly, building positive tactical responses to the barriers.

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<sup>1</sup> Construction Owners Association of Alberta. (2009) The Alberta Report: COAA major projects benchmarking summary. February.

<sup>2</sup> Mulva, Stephen. (2010) COAA Major Projects Benchmarking Program: Phase II. May.

<sup>3</sup> Construction Owners Association of Alberta. Heavy Industrial Construction and Maintenance: Workforce challenges in Alberta. (2011) May.

<sup>4</sup> Construction Owners Association of Alberta. (2012) Background Information for COAA Position Paper: Productivity and challenges in Alberta. May.

Our experience in this kind of work (innovative practices, change management, and technology adoption) helped narrow the search to a few initial areas:

- Does the research explicitly link best practices to revenue/cost in realistic scenarios?
- Does the math work? Is the cost of adopting alternative practices plus the pressure to deliver immediate results greater than perceived benefits?
- Are the incentives right? Do performance incentives embrace productivity enhancement activities? Who bears the cost of unproductive work?
- Do executives and managers have the necessary skills, tools, technologies and capacity to adopt best practices?

To understand these issues, we needed to interview corporate leaders. We needed to see these dynamics from the perspective of decision-makers who are on the hook to deliver results.

Interviews also helped us understand what data is still missing. The COAA work is ongoing. The interviews identify questions still unanswered. This is extremely useful. In the area of change management, we know that small data gaps create sticky issues that stagnate evolution.

It was important to ask:

- What data gaps remain?
- What nuances remain untested?
- What action would the nuances enable?

Clear evidence makes it possible to understand everything the COAA has achieved with its analysis, what issues remain unresolved, and what to do about them. Clarity helps leverage the data to identify the viable, market-ready practices leaders are ignoring.

## 2 THE ANALYTICAL PATH TAKEN FOR THIS PROJECT

### 2.1 Review data on best-practices

This project started with a review of best-practices. COAA produces a list of best-practices for the heavy industrial construction sector.

COAA worked to gather data to support the best practices. Some have support, others have none. Guessing that executives prefer evidence-based practices, we ranked them according to strength.

Of the 12 identified by COAA, half were strongly supported with evidence (front end planning, labour force management, construction management, engineering management/constructability, modularization, and benchmarking). But, as the reader will see later in this report, the executives we interviewed advocated only some of these.

Based on our interviews, for this project and others, we suggested it would add clarity if evidence-based practices were separated from opinion-based practices. Mixing them together is confusing. Clarity might improve adoption.

### 2.2 Initial interviews

We followed up the data assessment with a handful of interviews. We spoke with two owner companies, two constructor companies and one engineering firm.

We asked the executives for a high-level understanding of productivity's relative importance among other priorities, for their perspective on the barriers to advancing productivity, and for their sense of the major opportunities.

Executives told us that productivity is second only to safety. But, of course, this isn't true. Safety, regulations, and a race for resources are all more important. Every scheduling change and budget cut underlines productivity's relative significance.

Still, productivity is among the main issues concerning executives. The drivers that push productivity to chronically low levels are:

- Overlapping mega-projects all dependent on the same inputs,
- Unreasonable timelines,

- Labour, management and executive skill gaps, and
- Independence among owners, engineers, and constructors (rather than partnerships).

These high-level issues are too complex to attack directly. Still, the executives we interviewed saw the need for more than best-practices. Based on other work we've done related to similar issues, we suspected there were more tactical issues, rooted deep in the value chain.

We proposed digging deeper to gain a systemic view of the challenge.

## 2.3 Look past labour, dig deeper into value chains

To get started, we contacted 45 companies and interviewed 41 executives one-on-one.

We spoke with nine owner companies, six constructors, nine EPCs, and five manufacturers. For a sense of outside options, we interviewed five owners of similarly sized projects outside Alberta, four external-to-energy EPC companies, two constructors and nine manufacturers.

We asked for their priorities relative to productivity, we pushed past labour to discuss other issues within the control of companies that impact productivity. We asked about bottlenecks in the supply chain and the identity of key companies. We invited each executive to pick a juicy issue they'd chase if given the chase — a high-value target outside their day-to-day mandate. And, being deeply aware of our naivety, we asked each of them to suggest a question we should have asked if we'd known better.

The issues, nuances and details discussed in this report are a synthesis of what we learned in these conversations. We've disciplined ourselves to stay out of the mix. Where it's possible, the reader gets it raw from the executives themselves.<sup>5</sup> So, the reader should understand that it's not our voice they hear, it's the voices of the 41 executives we interviewed.

## 2.4 Global scan for lessons

Our contract included an investigation of global value chains. We wanted to find alternate practices and potentially new paths for Alberta.

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<sup>5</sup> Several executives asked to remain anonymous. To respect this request we've not attributed anything discussed here to the companies we heard from.

We looked at Norway, Venezuela, Italy, and Australia. But it quickly became clear that the executives in Alberta saw little value in this work. They see themselves as unique and, to be blunt, incomparable. We discuss this later in the report, but the punch line is: we rerouted effort from the global scan into a relatively focused investigation of Saskatchewan's mining sector.

## 2.5 Identify key issues, executive interests, and potential options

In this report we've tried to dig below the surface. We want to get past the labour constraints, regulatory barriers, and infrastructure gaps that executives raise as challenges to productivity. These are critical issues but are outside the reach of companies.

We searched for incremental, tactical, and operational options to press productivity forward.

The issues discussed here are stitched together from a systemic perspective. We've gone through a process of reviewing available data, interviewing a wide set of executives, and synthesizing the results together.

We think there are a few low-risk, high-value next steps identified in this process. These are things to tackle directly.

## 3 STRUCTURE OF THE VALUE CHAIN

### 3.1 High level structure of the sector

#### Systemic competitiveness

Places compete. We hear that often from executives. Companies scan the world for an optimal mix of resources, industrial ecosystems, policies, programs and infrastructure. Places compete for corporate investment.

Alberta's energy resources and industrial ecosystem make it competitive in oil and gas. But its policies, programs and infrastructure easily erode that position.

Alberta's project environment is well-short of ideal:

- The regulatory environment is transitory. The Alberta Energy Regulator is brand new and, so far, not well received. The royalty regime is volatile.
- Infrastructure is insufficient. Pipelines are glutted. New ones are blocked. Roads are crumbling. Resources stranded.

- Safety, while critically important, is increasingly an unreasonable constraint. Minor injuries are overblown. Fear dominates decisions. It's often an excuse for lack of performance.
- Labour shortages are crippling. From general labour to executive management, companies are short staffed. Regulatory issues limit access to global labour pools.
- Labour shortfalls and ravenous demand for inputs drive escalating costs. Materials, transportation and services are very expensive.

This, in broad strokes, is the state of Alberta's energy system. Companies tell us that it struggles to compete with the improving position of other jurisdictions.

### **Pacing development**

Given a picture of Alberta's systemic competitiveness it's important to recognize that the system is outside the control of companies. Certainly firms have an impact. But it is deep inside the domain of government.

Government is the gate-keeper on development. Its policies, processes, and approvals define moments of opportunity for energy companies. It opens the door that energy players move through.

But on the other side of that door, in the field, it's energy companies that pace development. And that pace is frenetic.

To lock in access, satisfy shareholders, and capture performance incentives executives lead their companies into impossible situations. Close up, it might seem like they've got no other option. But, from a systemic perspective, companies do this to themselves.

### **Productivity gaps**

It's no wonder why Alberta's project environment breeds productivity challenges. But it isn't at all clear what we should do about it. The issues are complex and compounding.

If left unpressed, executives put the blame in three places: labour shortages, government delays, and a super-heated economy. Each have real and substantive impacts. But all are outside a firm's sphere of control.



Of interest, for this project, are the less talked about areas that executives do control. When pressed, executives reveal real options for driving productivity. Contracting processes, performance incentives, benchmarking, risk management, and strategic learning will drive tactical improvements.

Tangible tools are where we focused our work.

## 3.2 Value chain evolution

### Facets within the value chain

Mega-projects involve many companies. Each company will engage several others within the same project. Every one of these facets creates transaction costs and impacts productivity.

In the past, owners, engineering, procurement, manufacturing, construction and services were often individual companies. A single corporation might provide one or two functions (like engineering and procurement) but no one firm provided all functions. It's different now.

Owners are pressing engineering and procurement firms to bring construction in-house. Companies, like Fluor, provide engineering, procurement, construction, maintenance, and project management. They've also recently partnered with Supreme Group to provide fabrication and modular production. They hope that integrating these elements will reduce transaction costs, enhance quality control, and encourage productivity.

Of course, creating larger companies often increases transaction costs within firms. Executives tell us that disruptive internal turf wars reduce productivity too. Spreading responsibility and authority across multiple departments within the same firm threatens production. We've been told that business was easier before these functions were merged.

### Controlling construction

In an effort to control complexity and encourage automation, some manufacturers and constructors are building in fab-shops instead of the field. Controlled environments enable more accurate implementation of modeling and Lean-like practices. It also reduces pressure on labour camps (executives say camps have major negative impacts on productivity).

Manufacturers and engineers that use Lean and Six Sigma report success. Adopting these processes takes time. There is a lag between implementation and results (one executive reported a 10-year delay). Still, executives are advocates.

The most successful lean-practicing companies say its got to be led by corporate officers, preferably the CFO. And, ideally, it's a process demanded by owner company CFO's. Aggressive use of the process creates evidence that drives the bottom line.

Lean processes identify quality bottlenecks. These bottlenecks reveal productivity challenges. An added bonus, elements outside the Lean process suddenly seem archaic. Having no data makes executives feel blind.

Executives bothered by this blindness, are looking to identify Lean-like processes in corporate learning and strategy design.

### **Regional versus international procurement**

Owners are always searching for savings, shorter turn-around, and competitive advantage. They encourage their procurement partners to reach internationally for materials and machinery.

Procurement companies, like all others in Alberta, are short-staffed. People in senior roles are spread thin and often lack experience. Many are pulled into Alberta from other places and lack local experience.

Drawing on international supply chains, built for other projects in other sectors in other places, procurement companies can be a rich channel for new best-practices. But sometimes these practices aren't fit for Alberta's unique physical and business climate.

Local manufacturers argue that full-cost accounting reveals the advantage of working locally. They say the materials purchased outside the region might be cheaper but are often off-spec and ill-suited for the cold climate, isolated sites, and unskilled labour used in construction. Production costs are higher and work required to fix mistakes is expensive. The front-end cost of purchasing outside might be lower but the total cost, manufacturing executives say, is higher.

Procurement executives see it differently. They agree that offshore purchases require tight inspection and constant attention. But with that investment, they say the quality is just as good. Local contractors tell us that they often buy materials offshore with no trouble at all. The suggestion is that manufacturers have simply been outcompeted by global players.

### **Management gaps, including strategic implications of tactical choices**

The management gaps in procurement are not isolated. The shortage is chronic. It affects every step in the value chain.

Executives say that the people next in line for top positions lack experience. Few of the upcoming executives have experience related to mega-projects. Even less have experience in direct leadership of projects of any significant scale. They lack 70 per cent of the background needed to round out their role.

This has major consequences. Inexperienced managers make tactical decisions that often have strategic implications. When those above them lack experience, they fail to foresee potential consequences. Choices today create complex issues in the future.

Additionally, as we discuss next, when contracting isolates facets of project development (sequestering owners from constructors and engineering from manufacturing), inexperienced managers cannot benefit from the experience of their project partners.

### 3.3 Context of contracting

In 2008, Alberta's energy sector slowed significantly. World-wide recession dragged down the industry and drove wide-sweeping change.

Manufacturing was heavily hit. To survive, in the face of trickling turnover, inventories were whittled down. An order that might have taken 36 weeks to fulfill stretched out to 72 weeks. The complexity of procurement rose exponentially.

Systemic changes, like those in manufacturing, have important risk implications. Constructors concerned about chronic labour shortages are reluctant to accept schedule and budget risks. Most engineers work on an hourly basis versus lump-sum engagements. Contracting compressed into short-term assignments.

Prior to 2008 it wasn't uncommon for manufacturers, constructors, and engineers to have long-term relationships with owner companies. Relationships often spanned multiple projects. Learning, productivity gains, and teamwork efficiencies passed along through projects. Trust-based relationships were strengthened.

This was all happening in spite of an over-heated economy. Labour was scarce and inputs were expensive. But when things started to slow down, the system fell apart.

In other jurisdictions, design-build contracts commonly use lump-sum and guaranteed maximum price mechanisms<sup>6</sup>. Not in Alberta. Input price volatility and labour constraints create too much risk. Reimbursable contracts are regularly used.

Reimbursable contracting is structured to preserve flexibility and moderate risk. Projects invariably evolve over time and reimbursable contracts make room for the changes.

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<sup>6</sup> The Construction Management Association of America. 2012. "An owner's guide to project delivery methods."

Unfortunately, it's a form of contracting that virtually guarantees adversarial relationships. Owners try to prove that new changes were part of the original plan. Engineers try to prove the constructors messed up implementation. Constructors try to argue that every new nuance adds significant new cost. Rather than collaborating, contracted parties shift blame between each other.

### 3.4 Unique in the world

The executives we interviewed believe their companies and the challenges they face are unique in the world. Only one of them identified a peer, outside the province, that they see as a global leader.

We've interviewed well over 500 executives in the last two years. About 100 of these are outside Canada. Another 200 are outside Alberta. Based on these conversations we can say, with 100 per cent certainty, that there are other companies out-performing Alberta's best companies while manoeuvring through similar economic and regulatory contexts.

It's incredible to realize that Alberta corporations know so little about international companies of similar kinds. There is so much to learn from outside players. There's no need to copy others but there is certainly an opportunity to learn from their alternative paths.

We agree that Alberta companies operate within a rare set of circumstances. Production costs are very high. The regulatory environment is onerous. Talent is scarce. But similar costs are seen in Arctic oilfields and oil shales<sup>7</sup>. The province's regulatory regime is unique but not vastly dissimilar from Australia's. Australia runs mega-projects of similar size in oil, gas and mining. Labour costs are higher in Norway than they are here<sup>8</sup>.

It might be true that no other jurisdiction faces all these dynamics at once. But it's also true that each issue is being dealt with, in alternative ways, in other places in the world. We can learn from them.

Regardless, this rooted belief that Alberta is unique in the world makes any global comparison useless. The only potentially acceptable comparison is one with Saskatchewan. A border away and within the same national context, Saskatchewan is subject to the same labour, capital and similar infrastructure constraints. In Saskatchewan there are several mega-mining-projects. This seemed to resonate with the energy-related executives we interviewed.

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<sup>7</sup> International Energy Agency World Energy Outlook, 2008.

<sup>8</sup> U.S. Bureau of Labor Statistics, December 2012.

Mining projects are vulnerable to the same challenges faced in oil and gas. About 70 per cent of mining mega-projects fail to meet cost and schedule projections<sup>9</sup>. So, it's not about one resource sector succeeding while the other fails. There's simply an opportunity for each to learn from the other.

We interviewed five mining companies (in uranium and potash), four related EPC companies, two constructors, and nine manufacturers inside the mining value chain. From a heavy industrial construction perspective, there are more similarities than not. One of the biggest differences, especially in the case of BHP's greenfield mega-project, is proximity to cities. They won't need to use labour camps and their supply chains are closer.

Of the differences we found, the most interesting is the investment mining companies make in upgrading their value chains. When a specific manufacturer or supplier is essential, mining companies will sometimes place their own people in the firm to upgrade its quality, safety, and production processes. Miners still go off-shore for supply but, in specific cases, they protect local firms in spite of higher prices. They do this to protect their long-term interest in that firm's services.

## 4 POTENTIAL PATHS FORWARD

There's no easy fix for the productivity challenges in Alberta. The energy sector is complex and its ecology is rich. A wide spectrum of firms are needed to keep it functional.

### 4.1 Leverage existing capacity to fill management gap

We've already mentioned the management capacity gap that threatens Alberta's energy-related companies. The issue won't be resolved quickly. It's a matter of training, over time, the people needed to fill the gap.

Until then, the shortage creates a solid excuse for cooperation. Adversarial relationships aren't sustainable. Companies can't afford to be isolated. Their executives only have 30 per cent of the experience they need. To make up the difference, they need to leverage the experience of the new executives in other firms.

By working together, with other firms, new executives can round out the knowledge needed to run projects effectively. Otherwise, they risk making decisions that have unforeseen, long-term consequences.

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<sup>9</sup> Merrow, E. 2011. Industrial Megaprojects: Concepts, strategies and practices for success. Hoboken, New Jersey: John Wiley & Sons, Inc.

## 4.2 Measures of risk and liability

Alberta's experience shortage requires new tools and systems to fill the gap. One of the most important areas is new measures of potential risk and liability.

A great indicator of this need is the remarkable indifference firms feel when contemplating the future of regional value chains. When questioned about the fate of local manufacturers displaced by global supply chains, few of the people we interviewed saw risks for their own firms. There was only limited recognition that they depend on the health of the local industrial ecology.

Too few of the owners recognized the potential long-term risk of wiping out local service and manufacturing companies. But clearly, these are the very firms to which owners will turn when servicing the facilities they are building today.

Wiping out existing companies, for the sake of front-end budget advantages, creates significant long-term liability. This is a measurable risk. It's a quantifiable liability. Until measured, executives are either ignorant of or guessing at the potential consequences of seemingly simple operational choices.

Owners readily say that they support local firms. And, while laudable, it isn't the support that matters here. Local firms, with their embedded experience and regional knowledge, are assets to the wider value chain. Evidence-based analysis of this value-chain that identifies critical bottlenecks and vital intellectual property would supplement the decisions of executives. This data would move decision-makers from guessing at the future to actual choices about their path forward.

## 4.3 LEAN-like, sophisticated process for integrating learning

Firms that adopt Lean practices are evangelists. The ones we interviewed are avid advocates. But many leveraged their success to illustrate the need for similar systems in other areas of their business.

A Lean-like process for driving strategic learning is needed. It's an essential response to the executive and management challenges in Alberta.

With coarse and blunt strokes, let's walk through the general trajectory of a mega-project in Alberta:

- Projects start by being put out for bids. This seems like a good move for the owner but it instantly sets up a zero-trust environment. It's a cut-throat process where engineers, constructors, and manufacturers battle their peers to provide the lowest bid, within the tightest schedule, at the highest quality.

- The winning companies are rarely given enough time to build the ideal team. They cobble together a group of readily available individuals and throw them into the project.
- The project team stumbles around trying to figure out each other, the other companies they're partnered with for the project, and the owners.
- The owner almost always starts by changing the schedule and the plans, immediately making the carefully crafted planning irrelevant.
- Plagued by schedule changes, budget volatility, input constraints, labour shortages, safety violations and regulatory uncertainty, the project teams toil doggedly through the five to seven -year process of producing the project. Inevitably, the zero-trust environment flourishes, seeded by the bidding process. Owners complain about engineering, engineering complains about construction, construction complains about schedules and materials, and manufacturers complain about the burden of inspections.
- Exhausted, the management teams of all the partners and any associated executives finally complete the project. The almost universal response is that it's over budget and past schedule. The teams are dismantled. Scapegoats are fired. And the process starts again.
- The learnings, strategic implications, and experiences within that specific project are dispersed and ineffectively captured. The individuals are often thrown into new projects where nothing is the same and the learning is only partially leveraged.
- The consequence is that executives tell us the projects today are no better, no faster and far more expensive than they were 10 years ago. Management is full of holes. And too few of the companies we interviewed trust anyone else.

Processes are needed to short-circuit this cycle. We need rigorous systems that mechanize the record of learning, make components available for new projects, translate implications for leaders, and make timeless the experience of projects.

We need tools that test tactical choices for strategic consequences.

Lean and Six Sigma are processes for managing complex production processes. We need to systematize learning too.

#### 4.4 Data management requires tools tailored for the industry

Data is a tsunami and heavy industrial construction is impacted just like every other industry. What to do with all this information?

Executives say their data is out of control. Too much, too fast and no clarity on what to do with it. Where handling quality assurance data took one person, it now takes six. Companies double but data-related functions grow by 12 times.

Companies need help mining the data they've got. They need help plumbing for data they need but aren't getting. They need help translating the data so that it informs decisions. They need to transform information into knowledge.

#### 4.5 Structural and cultural benchmarks (vs. best-practices)

We asked every executive interviewed to name a company they admired and viewed as a leader in their industry. Who, in the world, do you look up to? One mentioned their owner. A few mentioned companies, in other parts of the value chain, that they thought of as leaders. But not a single executive named a company they look up to as a benchmark.

It might be an honest answer, for a few of the companies we interviewed, to say they are top of their game. But it can't possibly be true for all of them.

Getting no answer at all seems to be a fairly strong indicator that there's a big opportunity to bring in outside market intelligence. The executives we interviewed aren't practiced at scanning for these lessons themselves.

Identifying, capturing, evolving and adopting the best of other industries or even other firms in other places is hard. The ability to absorb and leverage of the world's best is testable. For work outside this project we ran some numbers. Our preliminary analysis of absorptive capacity in Alberta suggests that the energy sector is weak (and, remarkably, agriculture is a strong performer).

Executives say the issue is top of mind but they aren't looking further than their neighbours for options. The industry would benefit from a trusted provider gathering market intelligence in areas related to productivity.



#### 4.6 Collaborate, minimize facets, communicate at executive levels

In the face of mounting productivity challenges, companies see the need to collaborate and minimize the barriers that inhibit efficiency. One of the most obvious ways of improving collaboration is for executives within firms to communicate, directly, with the executives of other firms. Many of the executives leading manufacturing firms have never met the executives leading engineering companies. Contracting arrangements constrain construction executives from going directly to the owners.

The transactions between types of companies usually take place at the managerial level. For the most part, this is tactical work (though it often has strategic implications). And, as already mentioned, these managers often lack experience and are incapable of conducting executive level conversations (our interviews with several managers confirms this emphatically).

#### 4.7 Create a new contracting paradigm

Another, more complicated path, but one that's likely to deliver transformational results, is to revisit the contracting process.

We've already mentioned the unintended consequences of short-term projects initiated by bidding processes. They erode trust and exacerbate the consequence of limited experience and management gaps.

But beyond bidding, contract construction creates barriers between firms. Companies need to cooperate but contracts keep them isolated. Even more importantly, the contracts isolate projects. They fail to carry over, into new projects, the firms that perform well. Everything falls back to zero in a new bidding round.

Admittedly, we're deeply naïve, but it seems useful to consider a facilitated process of new contract design. Get all the kinds of firms together, from all along the value chain, to cooperate in forming a "fantasy contract". A new kind of contract that embraces each firm's appetite for risk, incentives for performance, and relative responsibilities. A contract custom-built for today's business context. One that throws away all the complicated and confounding layers built up over time. Start fresh and get it right.

#### 4.8 Understand anti-competitiveness law

Anti-competitiveness law is one of the reasons a "new contract" idea might be pure fantasy. Some of the executives we interviewed think this concept would push their companies over the line.

That might be true. But there's a very real possibility that ultra-conservative interpretations of the law are keeping companies from cooperating in legitimate ways. The costs of productivity challenges are getting high enough and margins are getting thin enough that companies are open to testing the rules. It's no longer a matter of staying well-shy of the line. It's a challenge of getting as close as possible without breaching the law.

Work is needed to ferret through the rules and figure out where options exist. Open-minded, aggressive lawyers are needed to interpret the law. The system is too opaque for executives to do this themselves and, with all the fires they fight daily, they'd never get through it anyway.

Productivity Alberta can facilitate a process of creating clarity in this area.

## **5 RECOMMENDATIONS FOR PRODUCTIVITY ALBERTA**

We know that the board and management of Productivity Alberta want to run a pilot project, partnered with COAA, to test new contracting models and facilitated implementation inside a real-live project. This is ambitious.

Very few of the executives we interviewed knew anything about Productivity Alberta, let alone heard of the organization. What Productivity Alberta wants to do in a pilot project with require trust and a reputation that it hasn't got. It will also require capacity that it has yet to build.

We think there are a few incremental next steps available to Productivity Alberta that would go a long way toward creating the trust and credibility it needs to succeed in a pilot project scenario.

### **5.1 Gather market intelligence and benchmarks**

There is an important gap in the energy industry's understanding of its relative position. Alberta's companies believe they are peerless. This is rarely true.

Productivity Alberta could create a strong position for itself by building a criteria-based capacity for finding, understanding, translating, and providing market intelligence gathered from outside Alberta. Market intelligence would be valuable if it targets the creation of managerial capacity, contracting alternatives, value chain collaboration, and modularization and scaling of projects.

If the intelligence were reconciled with a transparent characterization where it was captured (corporate size, regulatory regime, project size, business costs), it would solidify its value.

## **5.2 Facilitate executive-level engagement**

There are many industry associations that appear to offer executives an opportunity to engage their value chain. Often mid-level managers and the odd executive desperate enough to attend the meetings populate the meetings. Something more sophisticated and behind-the-scenes is needed.

Productivity Alberta could leverage the market intelligence developed above to identify opportunities and use it to court a handpicked set of executives. No one wants another industrial consortium, but all of the companies want a chance to engage in productive opportunities.

By creating a productive context that brings executives together, Productivity Alberta would set itself up for the pilot project it wants to develop.

## **5.3 Encourage a new contracting paradigm**

The market intelligence and executive engagement developed above would position Productivity Alberta to propose an alternate contracting pattern. It could encourage its handpicked group of executives to approach contracting with fresh eyes.

Part of the market intelligence it brings to the table could include the contracting frameworks used in other industries (like commercial construction and manufacturing) and in other places (like Australia).

It is important that Productivity Alberta illustrates the validity and pedigree of the contracting processes it endorses. Providing detail on the DNA of these alternative structures will be critical. It's important that "salesmen" are kept out of the conversation. Too much rhetoric and hyperbole will destroy the fragile environment the previous two steps create.

## **A1. FEEDBACK ON BEST-PRACTICES**

In an earlier phase of this project, we explored the data available to test the best-practices recommended by COAA. Of the 12 recommended best-practices, six were strongly supported with evidence: front-end planning, labour force management, construction management, engineering management/constructability, modularization and benchmarking.

In our interviews executives advocated front-end planning, labour force management, construction management and engineering management/constructability. A few mentioned modularization. And several debated the relevance of the benchmarking work done to date.

Those that questioned the benchmarking work pointed to unaccounted-for-differences in scale, economic context, and culture.

It's interesting to note that executives are supporting the best-practices backed by the strongest evidence. Of the best-practices proposed by COAA that lack supporting data, only workforce planning was mentioned. Supervision/leadership and government influence were mentioned as issues but none of executives identified related best-practices.

Executives found it useful to measure other elements not covered by COAA's best practices. These include procurement cycles, capital efficiency on expenditure, dollars wasted per day, material costs indexes, local inflation, productivity indexes (comparing production in controlled facilities vs. on-site), business error omissions, and compensation structures (including performance incentives).

## **A2. PARTNERS, PROGRAMS, AND GAPS**

We've explored a long list of potential partners (or competitors) in the area of productivity. Some of the details discovered in that search follow the table below (Exhibit 1). This table is built to identify areas of opportunity for Productivity Alberta. Areas of open ground where the organization has strength and the market has needs.

In green, we've marked to richest opportunities for Productivity Alberta. Yellow signifies areas that are open but strength already exists. Red highlights the space where we think the ground is saturated, where Productivity Alberta could withdraw and be assured others better positioned for the task are meeting the market needs.

**Exhibit 1: Productivity Alberta’s strongest areas of opportunity (greens means go, yellow suggests caution, red says stop)**

<b>Issue</b>	<b>Supported by Productivity Alberta</b>	<b>Supported By Other Institutions</b>
Contract design	Trust Series with Warren Company	
Intra-firm collaboration	Trust Series with Warren Company	
Internal management of teams	Front Line Leadership Program	
Develop learning organizations		
Change management		
Data management/control	ICT Toolkit	CURT
Benchmarking/market intelligence		CMA, Canadian Value Chain Network
Management gaps	Operational Excellence, Front Line Leadership Program, LSS Training	CURT, SCMP, LSS Consultants
Regulatory challenges		COAA, CMA, AB Chamber of Commerce
Capacity upgrading	LSS Training	LSS Consultants, Quality Council of Alberta, Alberta Competitiveness Council
Logistics training	LSS Training	LSS Consultants, LCI, SCMP, Logistics Institute

## COAA

Construction Owners Association of Alberta - [www.coaa.ab.ca](http://www.coaa.ab.ca)

- Safety best practices
- Workforce development best practices
- Construction performance best practices
- Contracts best practices
- Workforce demand forecast

Range of tools within each focus area. Series of committees with a set of working goals.

\*No systemic view, best-practices are not structurally or culturally comparable, no benchmarks or hero companies

## LEAN consultants

Help manufacturers eliminate waste, boost gross margins and increase effective capacity.

Includes office operations, employee morale, product quality and market competitiveness. Enable self-managed teams, drive product quality, reduce cost, enhance timeliness and improve the company.

\*No similar process for integrating learning and strategic insights

## Six Sigma consultants

A business improvement methodology. Assemble project teams with subject matter expertise around a business area or issue. Guide through identifying, selecting and implementing possible improvements.

A set of tools and strategies for process improvement developed by Motorola in 1985. Seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes.

## **CMA, industry associations - [ab.cme-mec.ca](http://ab.cme-mec.ca)**

Canada's largest industry and trade association. Represents businesses in all sectors of manufacturing and exporting activity across Canada.

Focused on advocacy, intelligence on business trends and policy developments, cost-saving services and new sources of customer demand, leadership best practices to improve management, and networking opportunities.

Best practices includes process management, health and safety, and LEAN training.

\* Intelligence service is unique.

## **Quality Council of Alberta - <http://www.qualityalberta.ca>**

Quality Council of Alberta is a resource for businesses, public enterprise and not-for-profit organizations in Alberta and western Canada. Supports application of Quality Management and Continuous Improvement principles.

- Lean and Lean Six Sigma certification

- Weeds for good information on Quality

## **Colleges: Mount Royal, NAIT, SAIT, Norquest - lean, supply chain management\**

NAIT

- NAIT/Shell Manufacturing Centre, created to assist industries with improving their business processes by providing productivity solutions using time-tested and innovative technology, manufacturing expertise, and practical education in a collaborative environment. Includes Productivity Enhancement Services in project leadership and management, team-building, conflict management, risk management, operations management, quality management, and lean manufacturing.

Norquest

- Lean Six Sigma and Process Improvement

- Material controls, data assistant

## Canadian Value Chain Network - <http://www.canadianvaluechainnetwork.ca>

- Supported by Agriculture and Agri-Food Canada

- Series of modules:

1. Introduction to Value Chain Concept
2. Value Chain Development Planning
3. Market Intelligence: Gathering and Planning for New Product Introductions
4. Partnering and Collaboration: How to Approach Retailers
5. Understanding Category Management
6. Product Development: Are You Market-Ready?
7. Going to Market in the Canadian Foodservice Industry
8. Developing Value Chains in the Canadian Foodservice Industry

## SCL Canada - [www.sclcanada.org](http://www.sclcanada.org)

Supply Chain and Logistics Canada

- Offers professional development programs at the national and chapter levels.
- Networking opportunities, including annual conference, national events, facility tours, and golf tournaments.
- Identifies trends, benchmarking performance, and investigating contemporary issues.

## Logistics Institute - [www.loginstitute.ca](http://www.loginstitute.ca)

Logistics is a career choice and profession, like engineering or medicine.

- Internationally recognized professional credential earned by logistics practitioners to certify their competence as global supply chain leaders. Includes Process Management and Executive Leadership.



## **SCMP, Supply Chain Management Professional - [www.aipmac.ab.ca](http://www.aipmac.ab.ca)**

- Provides information and education, leading to a professional designation as a Supply Chain Management Professional.

## **The Business Link**

- Focused on small business startup services.

## **Alberta Chamber of Commerce - [www.abchamber.ca](http://www.abchamber.ca)**

Federation of 126 Chambers of Commerce, represent over 23,000 businesses.

- Focused on development and advocacy of policy to the provincial and federal governments - lowest possible tax and regulatory environment.

## **EEDC Productivity and Competitiveness Initiatives - [www.edmonton.com](http://www.edmonton.com)**

Offer the Supply Chain Collaborative Alliance Program, partnered with Productivity Alberta.

Focused on business retention, expansion, and attraction with attention on:

- Advanced technologies
- Education
- Energy
- Finance, Insurance, and Real Estate
- Health Industries
- Productivity and Innovation
- Transportation
- Workforce Development

## Alberta Competitiveness Council

Co-chaired by the Premier and AEDA Chair.

- Considers ways to improve Alberta's overall economic position and build on work already underway by government and industry.
- Looks factors that impact the province's economic growth such as regulation and fiscal policy, availability of skilled workers, transportation and infrastructure, productivity and innovation.

## Alberta Economic Development Authority

[www.aeda.alberta.ca](http://www.aeda.alberta.ca)

Provides business perspectives and conducts independent research on issues affecting sustainable economic development in Alberta.

AEDA solicits the views of the province's business community, academia, regional stakeholders and individual Albertans concerning economic development policy and strategies. Its mandate, as defined by the Alberta Economic Development Authority Act, is to:

- solicit the views of the business community, academia, regional stakeholders, and individual Albertans concerning economic development policy and strategies;
- provide an environment whereby business and government may work collaboratively in the development of recommendations regarding economic development policy and strategies; and
- provide advice to the Premier and Cabinet regarding economic development policy and strategies for Alberta.

## Ironworker Management Progressive Action Cooperative Trust - IMPACT - [www.impact-net.org](http://www.impact-net.org)

A labour management partnership designed to provide a forum for union Ironworkers to address mutual concerns and encourage balanced solutions.

- Grants to support core mission.

- IMPACT Construction College
- Project Tracking Systems

### **Construction Users Roundtable - CURT - [www.curt.org](http://www.curt.org) hits main points raised in interviews (Collaboration, Global integration, Effective knowledge management, Faster lessons learned)**

Purpose is to create competitive advantage for construction owners by making the industry safer, promoting overall cost effectiveness and productivity, and improving the way construction is planned, managed, justified and executed.

Committees include:

- Handoffs to Construction, investigate the current state of project execution including actual vs planned, major causes of changes and delays, metrics, and system improvement opportunities.
- International CURT, brings together owners with capital projects outside of NA
- Project Delivery (LEAN), creates and delivers a comprehensive series of LEAN workshops
- Process Transformation, technology-enabled collaborative asset delivery processes that result in measurable improvements and establish a broad perspective of industry-wide integrated technology systems to include planning, engineering, design, cost estimating, scheduling and project management
- National Conference Planning, address hot issues in the overall construction industry including those facing owners, contractors, suppliers, legal, technology, labor and the financial sectors
- Large Project Effectiveness, reduce cost and improve project predictability for the construction industry and standardize an industry approach for project management, performance measurement, and mega-project delivery
- Safety Improvement,
- Workforce Development, promote the CWDC Construction Labor Market Analyzer to facilitate more effective understanding of skilled labor requirements and availability

Offers Construction Owners Management Model Workshop

Press Room inactive since late 2011.

## Lean Construction Institute - [www.leanconstruction.org](http://www.leanconstruction.org)

Aims to reform the management of production in design, engineering, and construction for capital facilities.

Developed the Lean Project Delivery System that applies lean construction principles and tools to facilitate planning and control, maximize value and minimize waste through the construction process.

Lean construction produces significant improvements, particularly on complex, uncertain and quick projects.