Finding common ground in oil and gas

Now is the time for stronger collaboration on capital projects

IBM Institute for Business Value

Executive Report

Chemicals and Petroleum, Industrial Products

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Seeking transformative collaboration

The oil and gas industry is not known for doing things in small ways, whether it's creating the world's largest valve or tackling the most ambitious capital projects. As projects grow in size, scope and complexity, companies must manage greater risks. With more people working on expansive capital projects, parties must work as a cohesive unit and have the right information readily available. A stronger collaborative ecosystem is critical to manage risk by making partnering easier — "old ways" simply cannot suffice. Transforming collaboration depends ultimately on creating a culture to support knowledge sharing, creating and adhering to processes that embed collaboration at their core, and establishing the necessary technical infrastructure.

Executive summary

On-time, on-budget, and on-spec delivery are ever more critical as the number of capital projects in the oil and gas industry continue to grow in size. In 2013, there were over 180 capital projects greater than US$5B.[1] Overruns, delays and increased risk directly impact the bottom line and the workforce, as well as supporting industries like mining, steel production, contracted goods and parts manufacturing. Project overruns are the biggest reason many large projects are scrapped.

Companies are building increasingly complex structures to find and produce hydrocarbons. These mega-projects in oil and gas come with significant inherent risk. Typically, this risk is managed though global joint venture (JV) partnerships across many companies, making collaboration critical among these partnerships. In our new industry study, 52 percent of respondents cited the delivery timeline as the biggest factor driving the need for better collaboration over the next three to five years.

To understand more about the current state of collaboration in oil and gas, we conducted the 2014 IBM Oil and Gas industry Study, speaking with industry leaders who represent about one-third of those 180 large global capital projects. We explored which collaborative approaches would be ideal and how to close any gaps. In this report, we share findings and our analysis about how organizations collaborate both internally and with partners, along with recommended next steps for industry leaders to improve collaboration.

52 percent
of oil and gas industry respondents cited the delivery timeline as the biggest factor driving the need for better collaboration over the next three to five years

80 percent
of respondents rated both changes in workforce demographics and the need for repeatability as the most important issues impacting projects today

85 percent
of respondents rated managing total lifecycle costs as an important impact on capital projects

We introduce the idea of a collaborative ecosystem to enhance collaboration inside and between companies. Proactive improvements in collaboration can enable organizations to manage projects more efficiently. To be transformative, collaboration has to strengthen the capabilities of the project's people, processes and technology, all within a reliable, more secure environment.

The most recent IBM C-suite Study, "The Customer-Activated Enterprise," indicates that closer collaboration is one of the characteristics of high-performing companies.[2] This is certainly true for the oil and gas industry. Today, forward-thinking oil and gas CxOs recognize the need for closer collaboration inside their companies, and especially with their partners.

How can collaboration be enhanced in oil and gas capital projects – through technology and otherwise?

Grand collaboration challenges for oil and gas

Annual global oil consumption continues to rise. Most of the easy, less-expensive-to-find oil has already been found. The growing demand for energy is forcing companies to find and produce new reserves in remote locations and under extreme conditions. This keeps pushing the limits of technology and people while driving up the cost of a barrel of oil.

Large project development can span 10 years, plus decades of production life. One example, at 362 kilometres (225 miles) south of Galveston, Texas, the Perdido oil and gas platform in the Gulf of Mexico is a long way from the customers who need the energy it produces. Moored in 2,450 metres (8,000 feet) of water, it represents a new frontier in oil and gas production.[3]

Trade publications regularly cite large projects that have been formally shelved or abandoned due to cost overruns. In Australia alone, the total value of giant projects abandoned in 2013 was more than US$100 billion.[4]

These projects are undertaken with partners that can include: clients that will be consuming the hydrocarbons, such as an energy utility accepting LNG to provide power to its customers; other oil and gas companies, many with expertise to share in specialized areas, such as ultra-deep production; or simply a partner with financial resources.

"The number of involved parties is growing, which requires working together more closely. In addition, the increasing degree of replication forces parties to collaborate – a big change, since it includes relying on components designed or built by others."

Vice President, large integrated oil company

Satisfying multiple stakeholders

Each stakeholder may have different motivations regarding the project, and therefore, different priorities. For example, national governments — in the form of national oil companies (NOCs) — are often important stakeholders in projects. Their involvement can delay project plans as NOCs are often closely tied to the regulators overseeing such projects. Tax revenues generated from the sale of gasoline and other taxes can be a significant source of government income, so political influence can be an important consideration in choosing a partner.

And the workforce is changing due to aging employees ready to retire, as well as shortages of key skills needed to sustain the growing number of industry projects. Trade skills including welders, electricians and engineers appeared on Manpower Group's 2012 list of the hardest jobs to fill.[5] A hiring gap of more than 20 years created a missing middle management layer and left a younger, upcoming workforce with technological savvy, but much less hands-on experience.

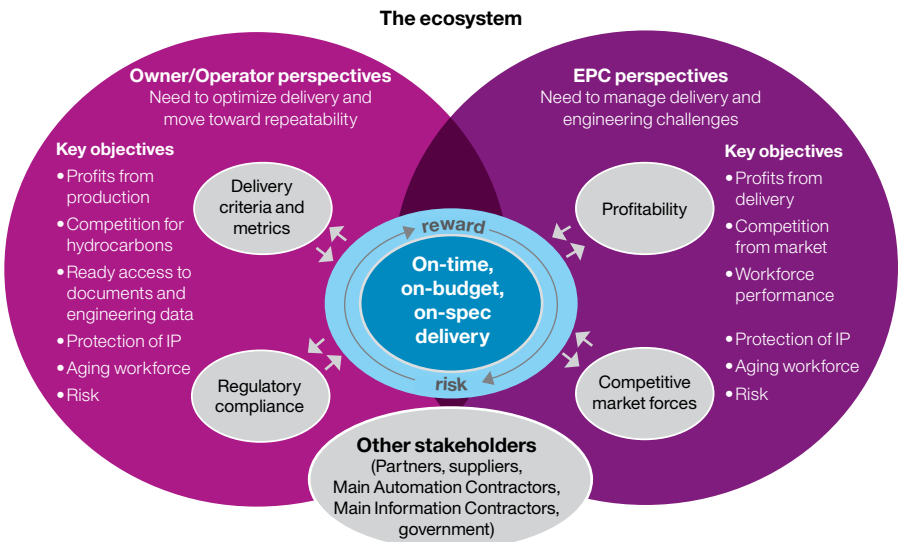
Most governments also impose strict local hiring requirements on the owner/operators of large projects, hoping to provide employment growth to their citizens. These local content requirements instantiated via lease or permit processes also affect contractor Engineering, Procurement, Construction (EPCs) firms.

Bridging two major perspectives in the ecosystem

When two or more organizations partner on a project, each brings its collective experiences, frames of reference and problem-solving skills. The partners represent at least two different entities — owner/operator and EPC — each with inherent long-term objectives. This creates the ecosystem in which they jointly develop a project, with some common objectives and some that are unique to each party's own vantage point (see Figure 1).

Figure 1

Traditionally, collaboration has been difficult based on different perspectives of two primary parties in the ecosystem



Source: IBM Institute for Business Value analysis.

"One of the biggest obstacles is the lack of know-how in IT as to how projects are executed. I have always proposed for IT/Legal and HR people to be put on a project for 6-12 months. The investment a company makes in doing so will pay itself back many times over."

Research and development manager, EPC

With all parties agreeing to a common goal of on-time, on budget and on-spec project delivery, important differences between owner/operators and EPCs can present challenges in a traditional approach to capital projects: for example, each has its own performance metrics that may conflict with the other. And while both groups must address IP concerns, an aging workforce and risk, the solutions that would be optimal for each are not necessarily the same.

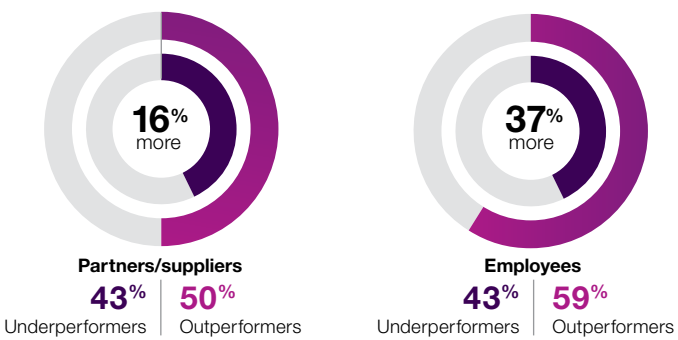
An enhanced collaborative ecosystem needs to help owner/operators and EPCs work together to engender greater collaboration and more mutual performance metrics, among other improvements. One approach to building these systems is with an information technology partner known as a Main Information Contractor (MIC). MICs often are able to build collaborative ecosystems taking advantage of cross-industry best practices and standardized KPIs.

A collaboration gap: Importance versus effectiveness

In the 2014 IBM C-suite Study, we found that outperforming companies collaborated more than underperforming companies, both with partners/suppliers and internally (see Figure 2). In our 2014 IBM Oil and Gas industry Study, we asked respondents to choose the top three most important issues affecting today's capital projects. Eighty-five percent of industry respondents selected reducing total lifecycle costs, followed by a tie between changes in workforce demographics (cited by 80 percent) and the need for repeatability (80 percent).

Figure 2

The most flourishing enterprises are typically those that liaise closely with their partners and suppliers, and actively promote the development of employee networks

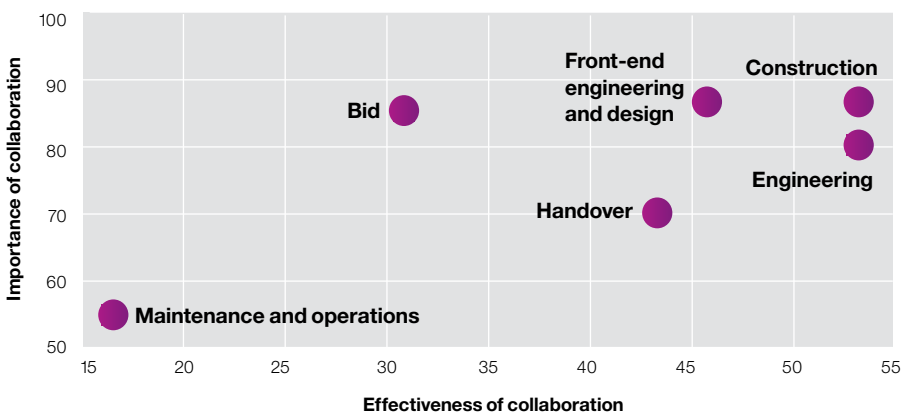


Source: "The Customer activated Enterprise," 2014 IBM Global C-suite Study. www.ibm.com/csuitestudy. Question B2: How strong is your collaboration with partners/suppliers and employees? (n=1,016.)

Respondents rated both internal and external collaboration as very important during various stages of capital projects (see Figure 3). However, across the board, less than 55 percent of respondents rated the effectiveness of their current project collaboration as good or very good. It is particularly weak during bid, cited by just 33 percent as effective at that stage. Though still weak overall, engineering and construction were described as the most effective stages for external collaboration.

Figure 3

Oil and gas respondents rated external collaboration as important, but many described their own collaboration as not very effective at most capital project stages



Source: Question 11: Please rate the level of importance of collaboration within your firm, at each stage of the capital project lifecycle? And how effective is your firm at collaboration? (n=15.)

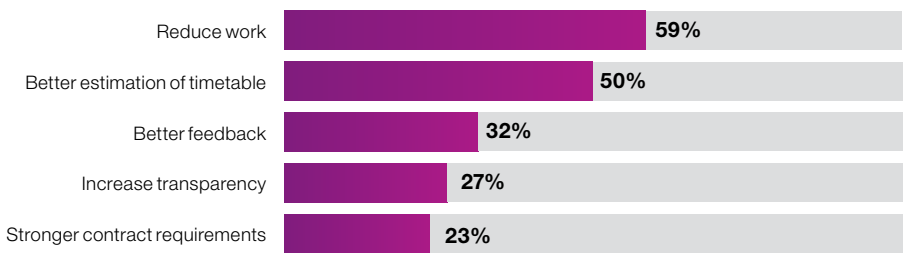
Collaboration barriers and benefits

Respondents identified several barriers to collaboration: cross-purpose metrics, lack of a sharing mechanism, and IT and management inattentiveness stood out above other concerns. Licensing and regulatory constraints hamper the sharing of information and data more than typical intellectual property (IP) conflicts among companies. However, identifying the many potential change management requests during engineering and construction stages that require regulatory compliance checks need to be addressed earlier in the project life cycle.

When asked to choose the biggest benefit to be gained from better collaboration, 59 percent of respondents cited reduction of rework, followed by better estimation of the project timetable (50 percent) and better feedback (32 percent, see Figure 4). Project leaders expect better alignment of operations and IT to be highly beneficial. Integrating IT employees into projects (such as assigning a 6-12 month rotation) and more synchronized performance metrics were expected to help to align the different groups.

Figure 4

Companies believe that better collaboration can lead to rework reduction and better estimation of the delivery timetable



Source: Question 43: How could better collaboration influence the financial or on-time delivery metrics? (n=22.)

"To date, the impact of cloud has been minimal. However, it will enable more and more entities to collaborate, especially with mobile access."

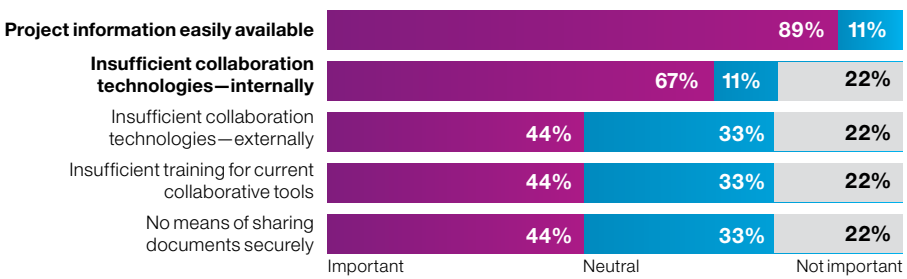
Senior Vice President, EPC

Technology and the collaborative ecosystem

Capital project leaders overwhelmingly (89 percent) identified easy access to information as the most important of five technological challenges (see Figure 5). And 67 percent of the respondents cited insufficient collaboration technologies inside their firms. This represented a frustration at not having ready access to the "right" data urgently needed to make critical decisions.

Figure 5

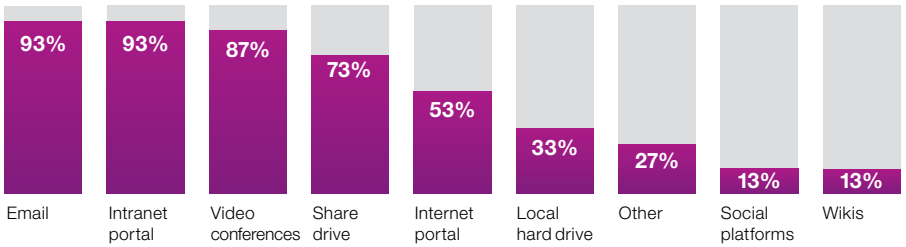
Access to needed information and the tools required to share that information illustrate the duality of technical and cultural issues



Source: Question 81: Please rate the following 5 issues by importance? (n=9.)

While traditional sharing tools such as email, intranets and video conferences are consistently used today, social platforms, sharing technologies and wikis lag significantly (see Figure 6). Newer technologies can provide an instant and robust communication and collaboration platform for team members, as well as a social sharing capability that can aid in retaining younger technology-savvy employees who already collaborate more readily.

Figure 6
Traditional sharing tools are consistently used, newer social platforms, such as Wikis and social platforms lag

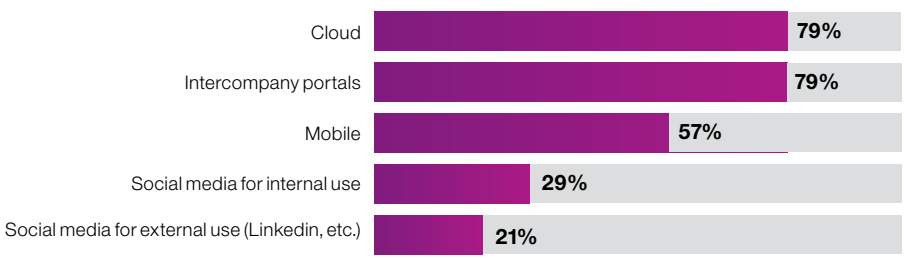


Source: Question 68: What current technologies are being used to support collaboration within and across companies? (n=22.)

And the traditional Gantt chart is clearly no longer sufficient to manage the dynamics of today's projects. Visualization tools with multi-dimensional renderings, location-based services and real-time data feeds provide so much more information. Some sharing technologies are used proficiently today (both cloud and intercompany portals are used by 79 percent of respondents), but there is definite interest in the benefits that cloud and mobile technologies can bring together in the form of social media (with 29 percent interest for internal use and 21 percent for external use, see Figure 7).

Figure 7

IT and line of business executives see the value that cloud and intercompany portals can bring to address their information sharing needs



Source: Question 73: What emerging technologies do you see on the horizon that would have an impact on the ability to collaborate in capital project development? (n=22.)

Recommendations: How to establish a collaborative ecosystem

Three categories of inhibitors limit project collaboration today: cultural, procedural and technical. The need for better data access — through structured data management and a tighter alignment of IT to the business and its needs — is a recurring theme. Transforming collaboration depends ultimately on creating a culture that supports knowledge sharing, the creation and adherence to processes that embed collaboration at their core, and the necessary technical infrastructure.

People: Tackle cultural inhibitors

Reinforce the value of collaboration as a part of your corporate culture. Collaboration among experienced employees and newer hires can allow for knowledge transfer, as well as the adoption of new collaborative technologies. Offer incentives for joint development of mutual performance metrics for individuals across JVs. Raise the visibility of successful collaboration efforts through corporate communications.

Incorporate collaborative competencies into the selection and development of team members. Add collaborative development exercises to management development programs. Even simple exercises that highlight individual learning and communicative styles can be beneficial to teams. Identify key resources to act as change agents fostering collaboration and reward incremental success in "easy" focus areas while executing a prioritized plan for harder ones.

Better align IT to business project goals. A path toward repeatability can be achieved through such alignment and by infusing collaboration in corporate culture. Establish performance metrics based on improving collaboration, starting with early lifecycle stages.

Several critical recommendations that are the foundational underpinnings of the collaborative ecosystem are: the need to embed collaborative metrics throughout the project lifecycle, including team selection; defining collaborative processes that define how a company executes work; and, aligning people with the needs of the business.

Processes: Make procedural improvements

Eliminate a major source of delays: engineering and construction rework. Change management requests need to be well documented and shared in a more timely way since engineering queries that lead to changes in design are less disruptive than design changes during construction.

Embed collaboration into project methodologies. Identify key inflection points where rework can be reduced by better collaboration. Enable people to create, store and manage their documents inside collaborative environments where teams can access them as required. Use a special identifier for data and documents starting at bid stage so that raw data and early assumptions can be re-examined and updated.

Define and develop internal and external collaboration processes. Spell out how the company executes work. Identify best practices and elevate across projects to develop "the way" your organization operates. Become event-driven to compress the cycle time through execution.

Technologies: Improve technical capabilities

Hone your information management practices. Deliver relevant and necessary project data that enables project teams to make better decisions. Enhance collaborative processes backed by the right tools to help ensure more collaboration across individual projects and reuse across project portfolios.

Aim for greater productivity efficiency. Enable better access to information through proven data management techniques; standardized rigorous processes and easier to use, more flexible tools. Create the foundation for repeatability of projects through collaborative processes. Cloud and other newer technologies offer much promise to enhance data sharing and collaboration, while providing needed security.

Integrate social platforms with your collaborative environments, data sources and analytic outputs. Tag data and documents to be shared for easier indexing and linkage to data sources. Implement analytics that include forecasting, simulation and optimization to drive both automatic and user-driven insights, scenario exploration and improved decision-making. Develop and use visualizations where individuals can collectively see and comment on the outputs from analytics and reports. Younger resources need to see that the company encourages and values collaboration — a vital aspect of hiring and retaining younger talent.

Establish secure sharing environments. Use cloud-based technologies integrated with mobile delivery platforms that support mobile tools for faster execution. Understand your collaborative needs in order to determine what cloud and mobile offerings make the most sense for you. A MIC could be particularly useful in disseminating information more readily as your organization looks to enable these newer cloud and mobile technologies.

"Our expediting expertise solution helps us in the process of identifying hidden experts and allows us to reduce time allocated to developing new experts."

Technology Office Director, large global industrial products company

Ready or not? Ask yourself these questions

- How could a recent overrun or delay have been caught earlier? What is your plan to identify or prevent them on the next capital project?
- Which aspects of your capital project would benefit most from better collaboration?
- What is your plan to improve collaborative relationships with particular individuals, internal organizations and other companies?
- How can today's available products, services and technologies help you improve collaboration with your peers and partners with?
- Would using a Main Information Contractor make sense for your capital project?
- What key characteristics are most important to you in a prospective collaborator? Which are you missing today?

For more information

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About the authors

Alex Zekulin, Ph.D. is the Chemicals and Petroleum, and Industrial Products Thought Leader in the IBM Institute for Business Value. Alex has over 20 years' experience applying data analytics and data management to the oil and gas industry. He specializes in data analytics of subsurface data including real-time data acquisition and analysis of streaming field data and the application of cognitive computing to solve upstream industry problems. Alex can be reached at alex.zekulin@us.ibm.com.

Keith Moore is an Associate Partner in the IBM Chemicals and Petroleum Center of Competence. He has over 25 years of industry and professional services experience with the development and execution of major capital projects. Key areas of concentration include the development, implementation and/or assessment of: business and operational strategies, portfolio and project management, information management activities and systems, contract management and administration and data analytics. He can be reached at kgmoore@us.ibm.com

Bruno Flach, Ph.D. is a Research Staff Member and Manager of the Natural Resources Optimization group at IBM Research — Brazil. Bruno has over 10 years of experience in energy and natural resources, having worked on the development of mathematical optimization applications to the electricity, oil and natural gas, mining and logistics industries. Current research efforts are targeted at the assessment and risk-constrained optimization of capital projects portfolios, resource allocation and risk mitigation strategies. He can be reached at bflach@br.ibm.com.

Executive sponsor

Manish Chawla, Vice President, Global Business Solutions and Worldwide Industry leader, Chemicals & Petroleum and Industrial Products

Contributors

Karen Butner, globally integrated enterprise (GIE) Study Leader, IBM Institute for Business Value

Jose Favilla, Industrial Sector Director, Worldwide Industry Solutions for Industrial Products, IBM Sales and Distribution

Zahid Habib, Global Business Solutions Partner, North America Chemicals & Petroleum and Industrial Products, IBM Global Business Services

Eric Lesser, Research Director and North America Leader, IBM Institute for Business Value, IBM Global Business Services

Ross Manning, IBM Global Business Solutions Partner, Canadian Energy Industry

Kathy Martin, Research Hub, IBM Institute for Business Value, IBM Global Business Services

Joni McDonald, Writer and Content Strategist, IBM Institute for Business Value, IBM Sales and Distribution

David Meek, Partner, IBM Global Business Solutions

Servane Tellouck-Canal, Business Development Executive, Chemicals & Petroleum & Industrial Products, IBM Sales and Distribution

Anne-Marie Weber, Visual Designer, IBM Sales and Distribution

David Womack, Industrial Sector Director of Worldwide Chemicals & Petroleum Strategy & Business Development, IBM Sales and Distribution

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