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Oil & Gas

Collapsing Costs: Curing Procurement.

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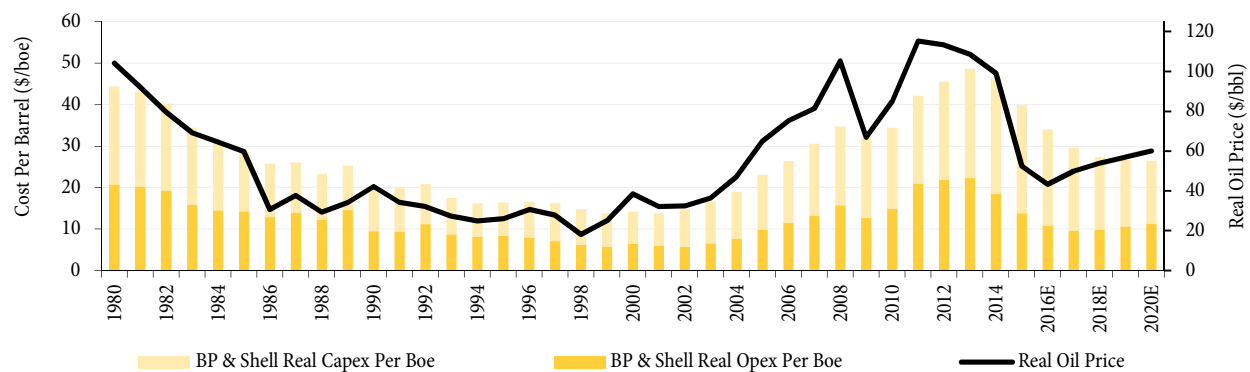
Thesis: If oil goes back to \$65 then Oil Majors are fairly valued on today's costs. But if \$40 oil entrenches, another 30% cost-deflation is needed. Hence this note explores a potential c15% further saving from procurement models. New digital platforms – the Uber or AirBnBs of Oil Services – are most deflationary. Unnecessary work is also being dis-intermediated (benefitting Tenaris) and integrated (benefitting Technip) while BP is the leading Major.

- **The average Major manages c100,000 suppliers** each, with an average contract size of c\$0.5M. Procurement departments comprise 10% of headcount, to manage this vast Services industry, with an average of 30 suppliers across each of 375 oil service sub-categories. However, c50% of work is sub-contracted, introducing extra layers of margins, and obscuring costs that typically vary +/- 15% per item.
- **The positive is that Majors are slowly starting to change procurement models.** Rather than simply pressuring headline contract-rates, which would re-inflate with the oil price, Majors are increasing their cost-benchmarking (Shell, BP), unbundling contracts (BP, TOTAL), contracting at greater scale (TOTAL, Shell, BP) and integrating large-scale orders for simplicity (e.g., Technip-FMC's 30% savings).
- **Digital procurement platforms could change the entire industry.** 23% of buyers already look online as their first port of call. Out top example, RigUp started in Jun-14 and now connects 17,000 US contractors with 150 US E&Ps, covering c5% of US L48 spending: It raises bids-per-award from 2.3 to 7.1, cost savings reach 30%, middle-men are dis-intermediated and nimble E&Ps can run 20-30x smaller procurement teams than Majors. Likewise, Achilles FPAL is connecting 92 North Sea buyers to 3,200 suppliers, verifying their credentials and performance with 90% lower cost than in-house systems. As one E&P put it, these platforms mean “the supplier doesn't have to write War and Peace every time they go after a tender”.
- **BP is changing most rapidly while Shell has most room for improvement.** BP is the only Super-Major using RigUp, and it uses Achilles FPAL, while contractor usage is down c30% since 2012. Conversely, Shell forces suppliers to pay a \$1,700-3,285 fee to access its own bespoke pre-qualification system, so it has half the supplier-numbers of peers, yet bizarrely, the highest headcount in procurement. Overall, reform to procurement models is positive, but Majors must keep adapting.

Entrenching: Why cost-deflation is critical

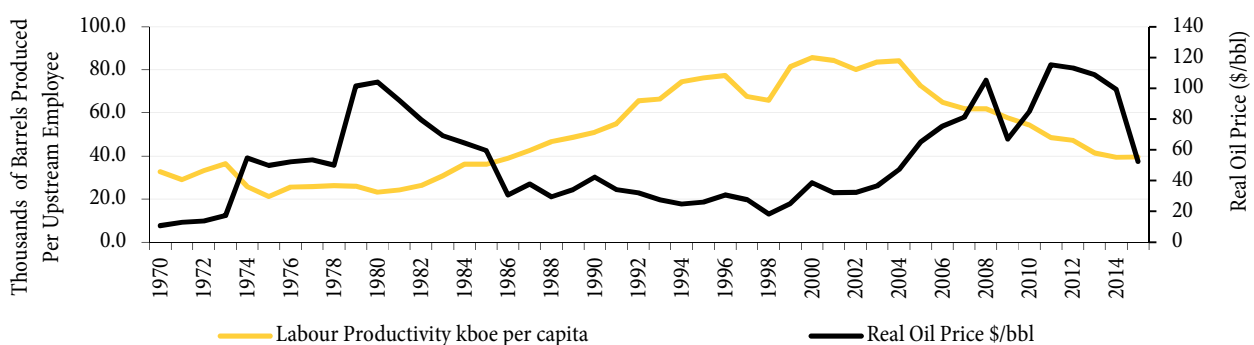
Throughout 2016, we have argued that low oil prices would entrench, by triggering cost-deflation. Thus marginal cost could re-calibrate at \$40-50/bbl. As a historical precedent, real costs fell c65% between 1980 and 2002 (Fig 1) and labour productivity quadrupled (Fig 2), helped by embracing new technologies.

Fig 1: Long-run link between UK Majors' opex and capex vs the Brent oil price



Source: companies, Redburn

Fig 2: Long-run labour productivity at Oil Majors (barrels produced per upstream employee)



Source: Redburn, companies

Our cautious view on the sector therefore hinged on long-run oil prices and costs:

- **Our base case assumptions** are keyed off the forward curve oil price, stabilising at \$60/bbl oil in 2020, down 40% since 2014. This is counter-balanced by 40% deflation in capex and opex per barrel in 2018-20 versus 2014 levels. Our valuations are calculated from discounted, sustainable free cash flow, so the result would be 10% downside to the sector's current market capitalisations.
- **Deflation matters.** Under the same c\$60/bbl long-run oil price post-2020, there would be 30% upside to our valuations if the Majors achieve 50% cost-deflation from 2014 levels; and 50% downside if the Majors only achieve 30% cost-deflation.
- **If oil entrenches at \$40/bbl**, then the Majors must achieve c60% cost-deflation from 2014 levels in order to preserve fair value for shareholders. If only 50% cost deflation is achieved from 2014's peak level, then again, 50% downside prevails.

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- **Where are we presently?** By the end of 2016, we estimate that oil prices will have fallen by c55% and costs have fallen by 40%. In other words, the sector is pricing in a recovery to c\$65/bbl, without any re-inflation in oil industry costs.

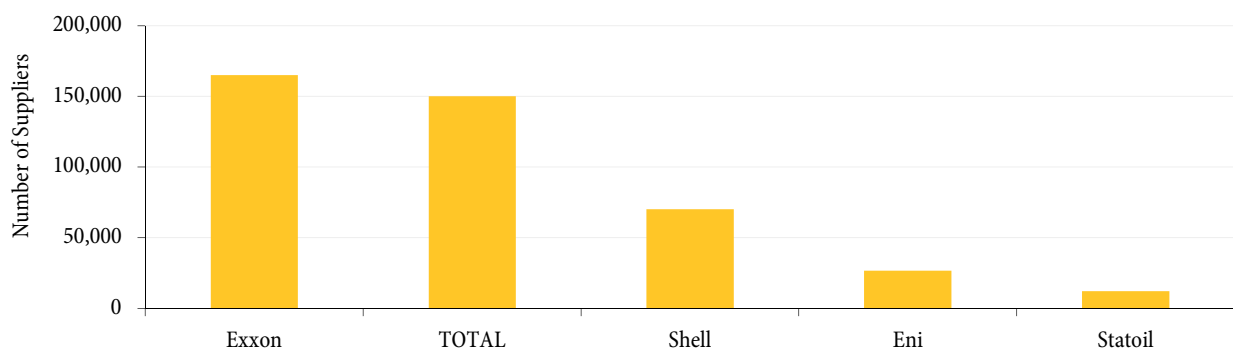
The cost and complexity of oil industry procurement

This note addresses the potential deflation from reforming oil industry procurement. Rate-deflation on oil service contracts have been widely discussed. But our review suggests fundamental changes in procurement procedures are also afoot: dis-intermediating un-necessary sub-contracting via digital procurement platforms, integrating the oil services value chain and a greater degree of cost-benchmarking. As context, we start by outlining the challenges of the Majors' procurement processes.

Each Major allocates \$ 0.5M pa of work across 100,000 suppliers, on average

The vast scale of oil industry procurement is visible in the purchase-books of Super-Major Oils. Exxon manages 165,000 suppliers of goods and services across its business. TOTAL's reach is comparable, purchasing c€30bn pa of goods and services. Statoil is most concentrated, nevertheless uses 12,000 contractors (Fig 3). So although the industry's multi-billion turnkey contracts are most visible to investors, they are the tip of the iceberg: the average Major is managing relationships with c100,000 suppliers, each accounting for c\$0.5M pa of the Major's cost-base on average.

Fig 3: Number of suppliers and contractors by Oil Major



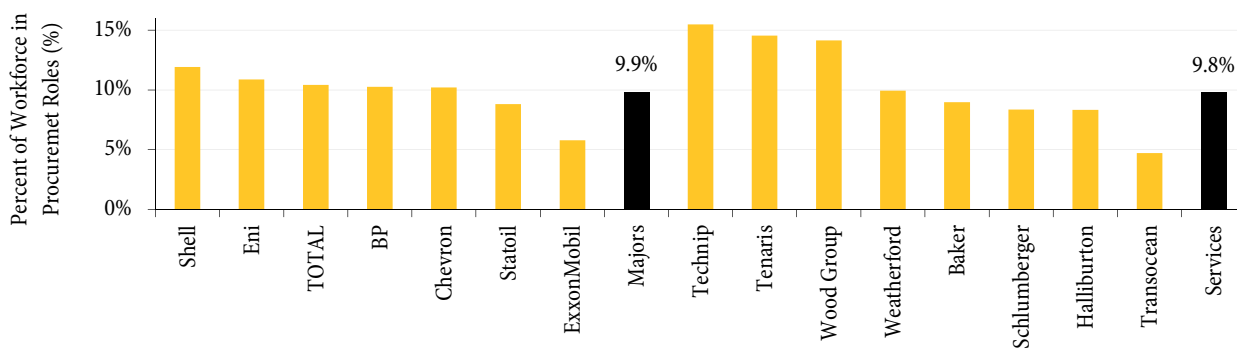
Source: Companies, Redburn

At what cost? Procurement comprises 10% of the industry's headcount

Fig 4 estimates that procurement personnel comprise c10% of headcount, both for Oil Majors and Oil Services. Specifically, we tabulated the number of employee profiles from searching LinkedIn for 'Procurement' or 'Purchasing' roles, at Oil Majors that spent \$230bn last year; and Services Companies that received \$115bn in revenues.

Back-of-the-envelope maths indicate that the entire industry could achieve c5% cost-savings (from today's levels) by doubling the efficiency of its procurement processes. This would improve our Majors' valuations by 12%, all else equal. Moreover, the total cost-saving could reach 10% of 2014's baseline cost base if the industry avoids over-paying on its most expensive contracts and dis-intermediates unnecessary sub-contracting. At \$60 oil, this would yield 30% upside to our valuations.

Fig 4: Personnel in procurement roles across Oil Majors and Services companies



Source: Companies, LinkedIn, Redburn

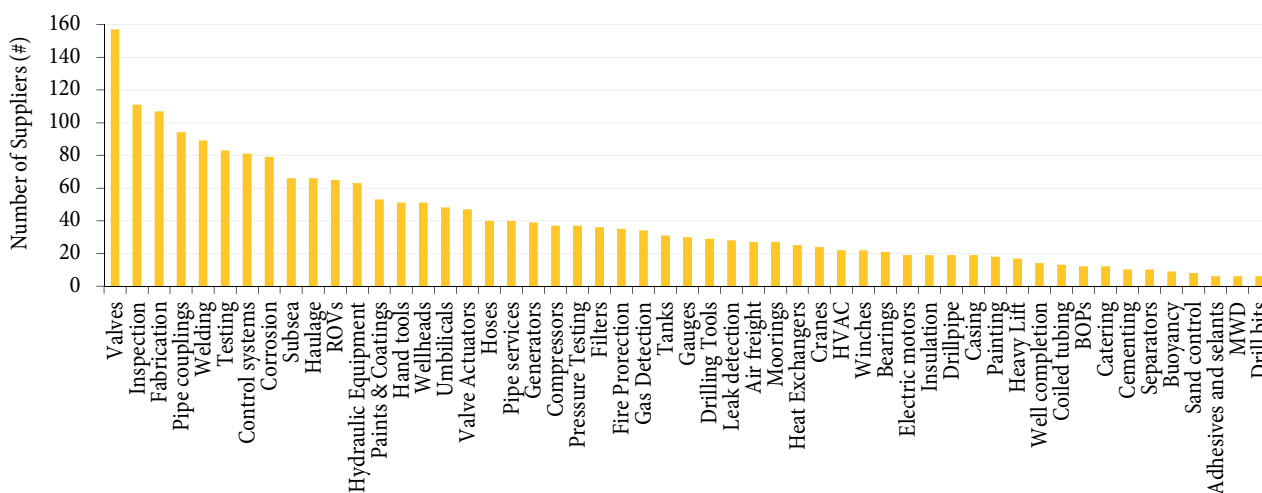
What are procurement personnel actually doing?

Procurement departments have three roles: maintaining relationships, conducting diligence on the supply chain and attaining value-for-money. We review each in turn:

The first function of Majors’ procurement personnel is to maintain a relationship with the supply-chain, which should not be under-estimated given the breadth and depth of the industry. For example, Fig 5 tabulates the number of Oil Services providers listed under fifty categories, which we selected from Pegasus’s Oil and Gas Directory. The full directory covers 375 different categories. The median service category has 30 different providers, so it is a formidable under-taking for a company to maintain relationships with all of the best potential providers in each category.

Furthermore, there are upwards of 50 providers in the most fragmented quartile of service sub-segments, such as valves, welding, testing and pipe couplings. Conversely, there are 15 providers, on average, even in the most concentrated service categories, such as drill-bits, blow-out preventers, measuring-while-drilling and sand-control.

Fig 5: Number of service providers across fifty (of 375) different oil industry categories

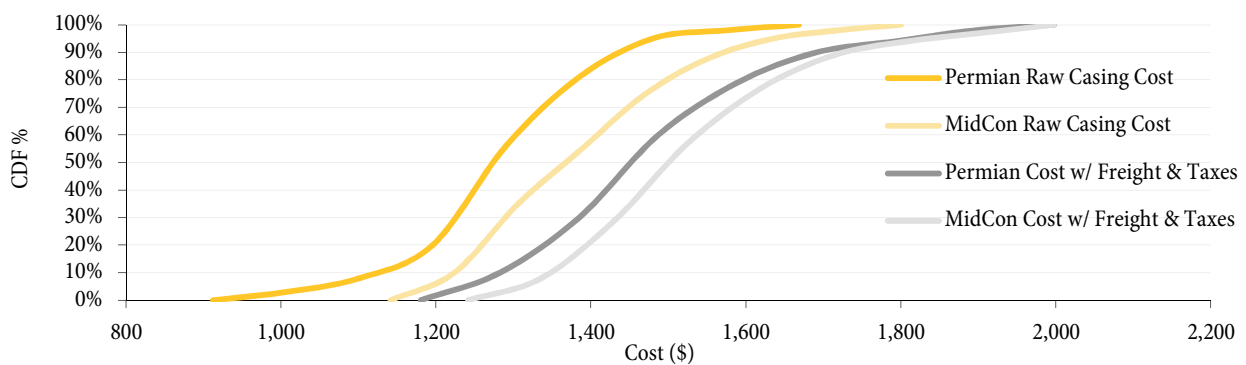


Source: Pegasus, Redburn

Due diligence is the second function of procurement personnel at Oil Majors. It would be negligent for an oil company simply to contract work to any supplier, given the safety-risks of the industry. Moreover, the average contractor failure costs the buyer £73k in financial losses. Both of these risks require significant due diligence.

The third function of the Majors' procurement personnel is to target value for money. For instance, Fig 6 shows the distribution of pricing on 9-5/8" casing for shale wells in the Permian basin and in the US Mid-Continent in the past six-months. Including freight and taxes, the inter-quartile range is c15%.

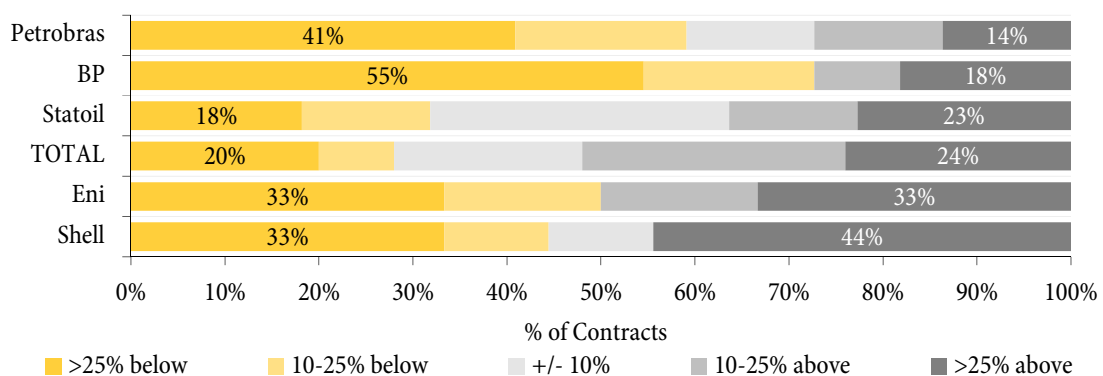
Fig 6: Distribution of costs for 9"5/8 inch casing in the US Mid-Continent and Permian



Source: RigUp, Redburn

Similarly, after evaluating 400 oil service contracts covering \$300bn of capex prior to the oil price downturn, we noticed significant differences in the turnkey contract costs paid for processing facilities, subsea equipment and pipelines across the different Majors, as summarised in Fig 7. Shell was historically been most liable to gold-plate projects: 44% of its contracts in our database were over 25% more expensively priced than peers'. Conversely, BP's contracts were 25% below our benchmark.

Fig 7: Percentage of contracts by company that are priced above or below comparable contracts



Source: company reports, Redburn

Recent procurement processes have significant shortcomings

The data do not suggest that the industry's procurement practices have been working particularly well in recent years. For example:

- **Not enough relationships.** Because of the vast size of the industry, many companies operate under a ‘three bids and a buy’ model (3B&B) for equipment, which will involve simply selecting the best of three bids. As per Fig 5, three hardly scratches the surface, when a typical corner of the industry has 30 suppliers.
- **Ineffective diligence.** Research by Achilles and IFF reveals that 27% of oil industry buyers do not have access to their suppliers' financial reports. c30% of suppliers lack anti-bribery or anti-corruption policies. A further 10% of buyers do not possess information on suppliers' HSE records. Conversely, suppliers commonly criticise the bureaucracy of the contracting process. So diligence can improve.
- **Value for money? The size and complexity of the industry has resulted in an uncompetitive model of excessive sub-contracting,** to push the relationship costs, search costs and risks away from Majors, towards Tier 1 suppliers. As a starting-point, consider the following quote from an oil company in the up-cycle:

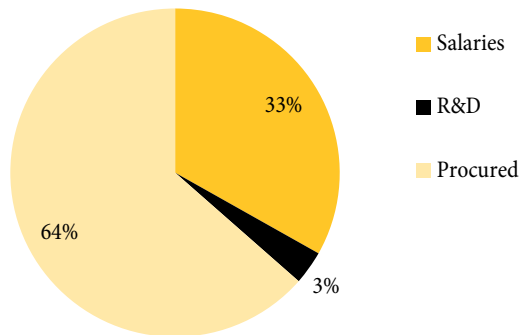
“Most companies would love to see big service company guys more because they do everything in one contract. This is good for [an operator] tied up with a long chain of tender procedures. So someone like Schlumberger can bring you your breakfast to the derrick, as well as huge equipment”.

With due respect, this image might raise a number of question-marks for shareholders. Asking Schlumberger to cater breakfast to the rig-floor is:

- 1 **Not a competitive allocation of resources,** given Schlumberger is primarily one of the world's most sophisticated Oil Services companies, not a waffle-house
- 2 **Sub-contracted,** then implicitly charged back to the client, inclusive of Schlumberger's margin
- 3 **Not necessary in the first place,** but a nice-to-have, which is bundled into contracts, even though the producer does not strictly need the service.

Sub-contracting has become increasingly common in the industry, reaching c70% of services performed on a typical well, according to a December 2013 paper from Cleveland State University. When we look through the cost-bases of the largest US Oil Service Majors, we think the number is lower. 64% of total cash costs are not explained by salaries of Service companies' own employees or R&D, but clearly this will not all be sub-contracted (Fig 8). So we estimate industry sub-contracting is closer to c50%. This is still an extremely high number, given sub-contracting involves paying at least two sets of supplier margins on the same equipment or services.

Fig 8: Breakdown of US Oil Services’ cash costs as salaries, R&D and procurement



Source: Companies, Redburn

Companies included: Schlumberger, Baker, Halliburton and Weatherford

Curing procurement: A revolution across the supply-chain

Fortunately, procurement models are being disrupted amidst the downturn. For smaller-scale Services, the innovation is digital procurement platforms, which are democratizing the procurement process so producers can engage the supply-chain directly and un-bundle ineffective sub-contracting. For larger-scale fabrication contracts, the supply-chain is integrating and standardizing its output (Fig 9).

Fig 9: Advantages of democratizing simple service contracts and intergrating large-scale fabrication contracts

Issue	Simple Service Agreements		Large-scale fabrication	
	Status Quo	Democratization	Status Quo	Integration
Excessive Scope	Unnecessary components bundled in	Limited to what's necessary	Over-complicated by producer's design teams	Most efficient system vendor can design
Uncompetitive Pricing	"Margins on margins" due to sub-contracting	Deflated by un-bundling sub-contractors	Inflated by orchestrating multiple contractors?	Deflated by consolidating contractors
Time consuming for producers	Vast procurement teams to connect with, monitor and benchmark suppliers	Smaller procurement teams due to digitisation	Vast engineering teams for project-design and procurement teams to benchmark suppliers	Engineering, procurement, checking and testing costs can be lowered
Risk exposure for producers	Opacity on sub-contractors	Reduced by verification and performance reviews	Cost-overruns and project delivery risks	More execution and project management transferred to leading providers

Source: Redburn

Note: Simple service agreements tend to be shorter-cycle and are predominantly onshore; while larger-scale fabrication is longer-lead and predominantly offshore

(1) Democratization: The rise of digital procurement platforms

What has changed the landscape for US procurement is the emergence of digital market places. BP's Upstream CEO, Bernard Looney recently alluded to the broad set of improvements unlocked by digitations:

“We also want to modernise the way we do business, adopting digitisation and the use of big data which we believe can drive a real step change in

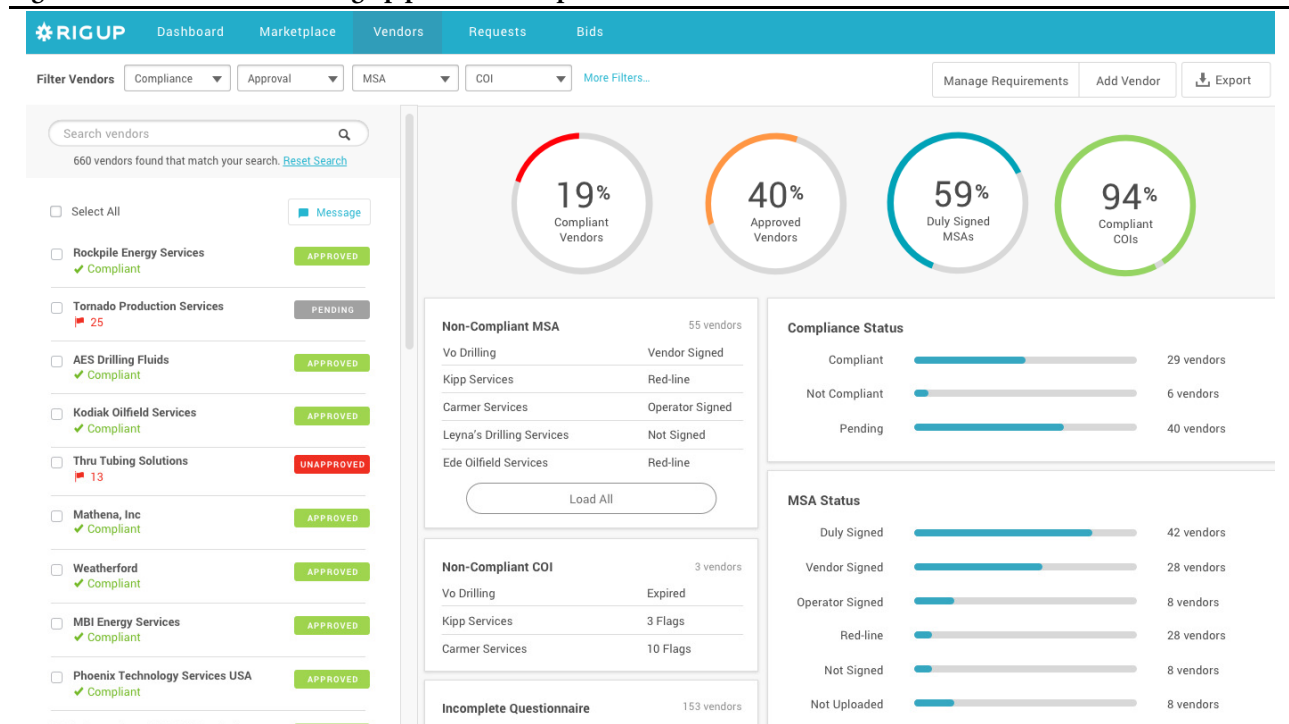
performance and efficiency. A great example of this digitisation in action is a project we are running in the North Sea, with our partner from Silicon Valley. Through the ability to store and process huge volumes of data it has allowed immediate access to 100's of thousands of legacy documents which can be searched for and retrieved in seconds, as well as reducing well screening time from "months to minutes", thanks to a searchable database of 10,000+ wells that can process a query in seconds. All of this has led to a significant reduction in cycle time and enables our people to focus on real value added work and not administration. That hopefully gives you just a sense of the enormous possibility that embracing digital innovation can bring. And of course, our people love it" ~ Bernard Looney, BP.

The most material change could be in a new wave of digital purchasing platforms, which you can consider as the Air-BnBs and Ubers of oil industry procurement. Two case studies are RigUp onshore in the US and Achilles FPAL in the UK North Sea.

RigUp: Democratizing procurement across 5% of US Oil Service

The most exciting example of disruptive procurement models we have encountered is RigUp, which is currently used by 17,000 service contractors, in order to win work that is out for tender from 150 smaller US E&P companies. Screenshot are shown below from the RigUp platform, tracking vendor compliance with company standards (Fig 10) and vendor pricing, for obtaining the best value (Fig 11).

Fig 10: Screen shot from the RigUp procurement platform



Source: RigUp

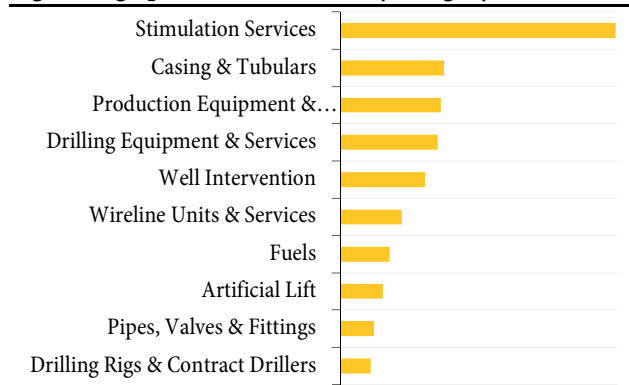
Fig 11: Screen shot from the RigUp procurement platform

Group by	Section	Group	Sort by	Company Name: A-Z	Company Name: Z-A	Total Cost: Low to High	Total Cost: High to Low	B&L Pipeco Services	DRM Oilfield Tubulars	Harpole Construction...	It Me, Co.	Legendary Energy Compa..	
	Compressor Station Work			\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	
	8" Steel Line			\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	
	6" Steel Line			\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	
	4" Steel Line			\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	
	Rock Add-on (Ditching)			\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	
	Pad Add-on (Ditching)			\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	
	Steel Futures			\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	\$405,789	
	4" Launcher & Receiver			\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	\$336,660	
	Section Total			\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	
	Transportation												
	Compressor Station Work			\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	
	Foreign Line Crossing - Hard Rock			\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	
	Section Total			\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	
	Total Cost			\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	\$50,000.00	

Source: RigUp

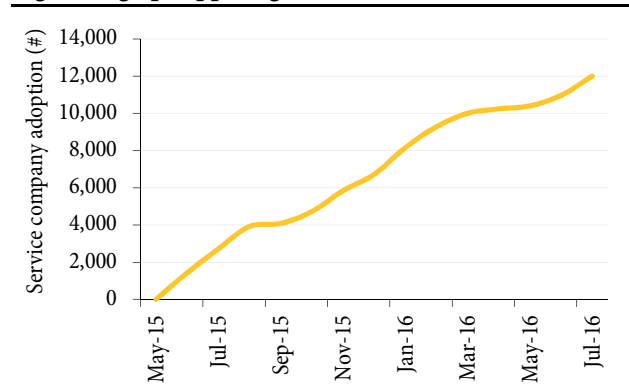
What surprised us most about RigUp is its meteoric growth. The company started in June 2014, launching to a wider marketplace in February 2015, with data on 3,000 service providers in the Permian basin. Toward the end of 2015, service providers reached 6,000-7,000. Today the numbers are closer to 17,000, spanning the entire L48. RigUp estimates that c\$300M/month of OFS work has been contracted via its platform, placing its US onshore market-share around 5%. 23% of service companies now use “digital” apps (e.g., RigUp) as their first port of call. RigUp also covers all major Service categories as shown in Fig 12.

Fig 12: RigUp transaction value by category



Source: Rig-Up, Redburn

Fig 13: RigUp supplier growth



Source: Rig-Up, Redburn

We noted the following benefits of procuring work via RigUp’s platform:

- **Greater reach.** Because its network effect now spans 17,000 suppliers, more bids can be surveyed in a shorter space of time. One E&P in the Permian was able to increase from 2.3 to 7.1 vendors per bid.
- **Contract cost Savings:** One E&P, 3Rivers saved 30% on an Authorisation for Expenditure for a drilling programme (initial bidding in March-2016 vs April-2016), with savings on wellhead and cementing equipment as high as 44%. A

large, inefficient E&P with poor contracting could save c40% through transitioning to its platform, RigUp estimates.

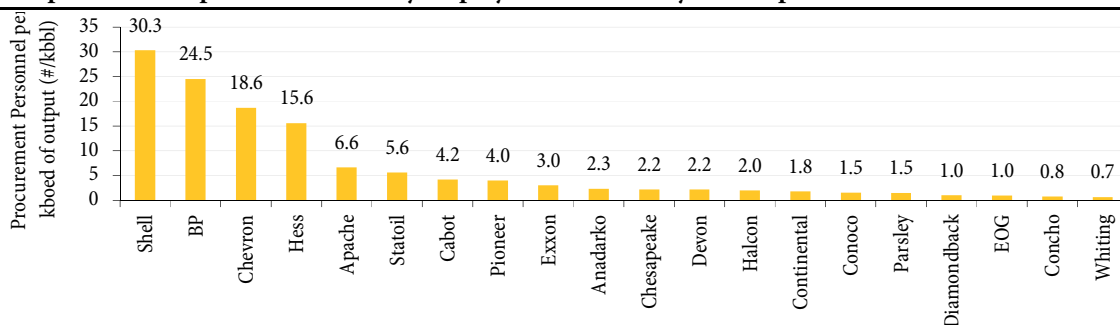
- Unbundling takes out an unnecessary layer of Oil Service margins.** As discussed above, many Majors operate global framework agreements with ‘preferred suppliers’. In many cases, these preferred suppliers then sub-contract work out and simply earn a margin for coordinating the sub-contractor. **One Large E&P** was cited by a critical industry source: “They have six preferred providers for directional drilling. But none of them actually do directional drilling.” As another example, there are 200 distributors of OCTG in the Permian, in turn, sourcing from just 6 major OCTG producers. RigUp now allows E&Ps to purchase direct, circumventing unnecessary distributors.
- Time savings:** In another case-study, another E&P, Ameredev, onboarded 17 contractors in <1-week, with <24-hours screening time per contractor.
- G&A Savings.** “It does not require 100 people to purchase pipe”, Xuan Yong the CEO of RigUp told us. Yet Major independents will have 100-200 people dedicated to US unconventional purchasing, where smaller companies are running comparable rig crews with 4-5 people.
- Benchmarking potential.** Anonymised cost data is now available for benchmarking, which can be obtained from the RigUp platform, rather than tabulated by oil company procurement teams. Now RigUps’s network effect is large enough to eliminate non-disclosure.

Finally, transparent pricing data could be used to mitigate re-inflation of the shale industry’s costs, in the event of another up-cycle. Areas of ‘surge pricing’ are visible for the first time on the RigUp platform, to direct additional resources to hotspots of activity that are under-supplied and therefore in need of more services.

Different models: How do you justify 20-30x higher headcount?

It is clear that small-scale US E&Ps do not strictly require large procurement departments, after comparing the headcounts in different companies’ procurement departments (Fig 14).

Fig 14: US procurement personnel currently employed across twenty oil companies



Source: LinkedIn, Companies, Redburn

Efficient US E&Ps companies appear to employ an order of magnitude fewer personnel in procurement (<1 person per kbbl of output) than large Super-Majors (25-30 people).

Achilles FPAL: Democratizing procurement in the UK North Sea

Our second case-study of a digital procurement platform is Achilles FPAL, an online portal connecting 92 buyers' ongoing needs to a chain of 3,200 suppliers, each of which is credentialised by 2-year audits, performance review scores across 15 categories and standardised documentation. Its focus is on the North Sea. To join the platform, a vendor must be 'verified' via site visits to check their capabilities are as purported. FPAL's advantages have been praised by oil producers in the basin.

- **10x cheaper than in-house procurement.** One North Sea E&P recently highlighted that "what you pay as a buyer is substantially less than if you were to develop a bespoke [vendor management] system from scratch... by **at least ten-fold.**"
- **350% RoI from improved decision-making.** Another North Sea E&P calculated a 350% return on capital over 3 years for signing up to FPAL, highlighting time and cost savings, in accessing a wide network of suppliers: "The most critical thing for us is the volume and quality of data ... It allows us to make more informed decisions, faster."
- **Increasing the efficiency of the supply-chain** was also highlighted in industry comments. The supply-chain manager at one inspection and testing company stated "*We firmly believe Achilles FPAL is a driver to increasing efficiencies*".

Below we outline three ways that Achilles improves efficiency:

- **Availability of reliable data.** One E&P company noted that "Everything you'd usually ask for [about a potential supplier] is already there on the Achilles platform... The buyer doesn't need to ask for the same information again and again and the supplier doesn't have to write War and Peace every time they go after a tender." Another global contractor highlighted the value of being able to conduct diligence of sub-contractors without picking up a phone or awaiting a response, particularly useful due to time-differences in a global operation.
- **Quality control.** One manufacturing giant notes that its higher-quality service than peers' can save clients money in the long run, while the performance scores on the FPAL platform have made the value in its premium offering clearer to buyers: "you are only as good as your most recent Performance Feedback reviews".
- **Continuous improvement** is also highlighted within FPAL testimonials, as many contractors noted measures that were specifically undertaken to improve their 'scores' on FPAL, in response to audits or feedback from prior work.

Fig 15 summarises other testimonials from the supply chain over the value derived from participating in the Achilles-FPAL programme.

Fig 15: Testimonials for Achilles FPAL from sales personnel within the supply chain

	Description	Quotes
ABB	Manufactures electrical products and instrumentation	"The benefits from the Achilles FPAL assessment criteria and independent customer Feedback scoring are invaluable... Achilles FPAL creates efficient business relationships between ABB and the customer's technical and procurement teams...demonstrating ABB's competency"
Arco	Supplier of safety clothing and equipment, £280M annual turnover	"I can't sing Achilles' praises enough... The feedback from the Achilles FPAL Verify Audits help us develop as a company. We are very proud of our most recent scores and always encourage buyers to check them out."
Control Valve Solutions	Leading market specialist for bespoke, control and isolation valves.	"The FPAL Verify stamp is very useful. The first question from buyers is always, 'are you on Achilles FPAL?'... Saying yes means there are no further questions... The first audit was very intense and we were surprised by how involved it was, but it really helped us identify our weaknesses"
Offshore Independents	Project management from pre-FEED to abandonment	"More buyers are now aware of our capabilities as a result of being FPAL and JQS registered. As a company operating in our sector, the Achilles registration is a must – the entire industry can find you with ease, in one single, simple to use place, where you can demonstrate compliance and expertise."
Odfjell	Drilling contractor with 23 fixed and mobile units in the North Sea	"We find Achilles FPAL is an effective screening tool to compare and identify supplier capabilities when building our approved vendor list... Our key competitors are also registered and we monitor their progress"
ProTech Flow Solutions	Supplies valves, pipes, fitting and flanges	"Achilles FPAL is a very useful sales tool... You can go on the website, download PILOT Forward Workplans for Achilles FPAL buyers and approach them"
Rainford Solutions	Bespoke electronic equipment enclosures	"Achilles allows us to get our foot in the door. Without them we wouldn't find out about buyers ... and they wouldn't consider buying from us."
Score Europe	Valve and gas turbine refurbishment.	Describing the contracting processes of customers such as Shell, BP and Exxon: "The larger and more attractive tenders refer to the Achilles FPAL site, and all the major buyers participate"
Stork	Testing and inspection	"We have benefited from Achilles FPAL registration by being invited directly to bid for ... increasing efficiencies within the supply chain" ~ Sales Manager

Source: Companies, Redburn

Alternatives to Achilles – and more to come?

Finally, we note several similar services to Achilles FPAL in other regions of the world.

- **ISNetWorld** is a global resource connecting 490 hiring clients with 62,390 contractors, used widely by Statoil in the US and Canada. It collates, verifies and benchmarks safety, insurance, quality and regulatory information on contractors. 13bn work hours of activity were funnelled through ISNetworld in 2015. 49,000 insurance documents are reviewed each month, by ISN's review and verification services and 500,000 written programs are reviewed annually, **saving 75% of the time on pre-qualifying clients versus in-house reviews**. Contractors in the ISN portal report also 55% lower incident rates versus the US industry average (2014).
- **FindContracts.no** is a similar service for contract transparency and advertising new work-orders offshore Norway. It is used by Statoil, Shell, VNG, Centrica, Kvaerner; endorsed by the Norwegian Ministry of Petroleum and Energy.

Benefitting from dis-intermediation: Tenaris is pioneering the approach

Within our coverage of listed Oil Service companies, Tenaris is benefitting most from the trend toward dis-intermediating unnecessary distributors: rolling out a new, lean-inventory offering in tubular steel for use US shale. Tubular steel operates under an outmoded distributor model, whereby millions of tons of steel sit unused in pipe 'supermarkets' which stock every conceivable grade from every major supplier. The

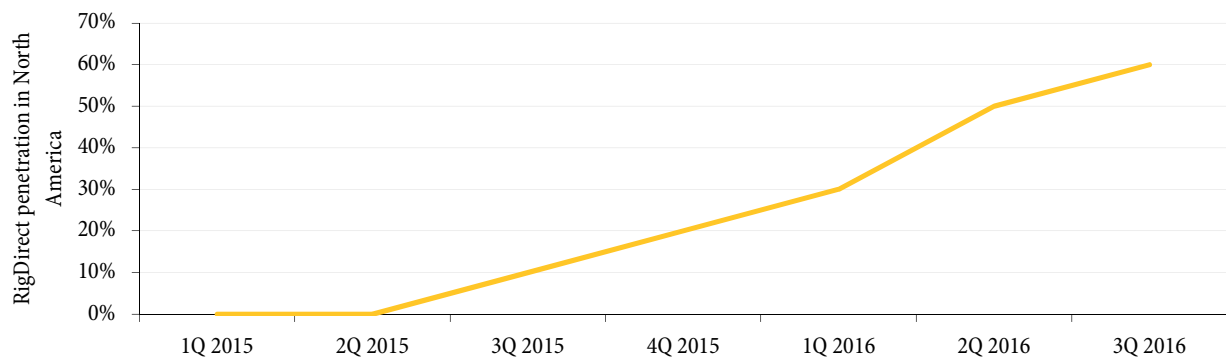
approach is working capital inefficient, but has endured for decades. The oil price crisis is leading to a re-appraisal of this model, initially catalysed by Tenaris itself.

Rather than using a distributor as a middle-man, Tenaris asks its customers to hand over their well architecture plans. Tenaris uses this information to tailor a pipe delivery program supplied directly to the well site, as and when the pipe is needed. This platform, dubbed *RigDirect*, releases 80% of the working capital tied up in steel; cash which accrues to the customer. Tenaris shoulders the, smaller, working capital burden itself, but in return receives all of the business from the customer in the basin, and can limit mill runs to only pipe that is needed, improving fixed cost absorption.

Tenaris is the largest single player in US shale, with roughly 25% market share. The adoption of RigDirect was zero at the beginning of the oil price crisis, but has now risen to over 50% (Fig 16). Notable customers such as Pioneer and ConocoPhillips have signed up. This lean inventory model is a major pillar in our Buy case.

Finally, it is interesting to note that this type of inventory inefficiency is not uniform in the industry. The RigDirect approach was pioneered in Mexico, which has been operating under this system for decades. Having a cash-constrained monopolistic state oil company does then lead to some innovation.

Fig 16: Penetration of Tenaris's RigDirect offering, within North America



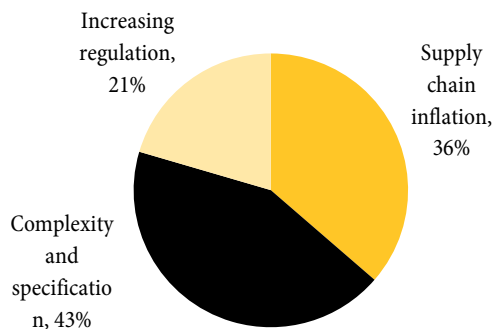
Source: Redburn, company

(2) Integration: from customer-constraint to design competition

Certain parts of the Oil Services chain are also moving toward having fewer, larger competitors, contrasting with the 'democratisation' process above. This is an important positive for high-value-add, large service providers which are willing to adopt new, integrated procurement models, such as Technip.

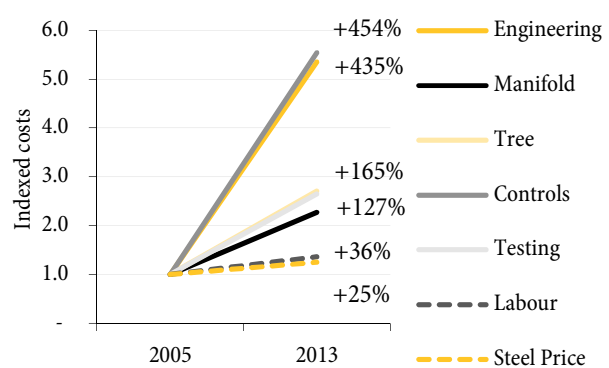
The offshore procurement chain is still fairly immature: Subsea manifolds are usually made to customer-specification, which proved to be highly inflationary, as complex specifications explained 43% of the Gulf of Mexico's 2.3x like-for-like cost-inflation between 2000 and 2012 (Fig 17). Engineering costs increased 4.4x from 2005-13, rapidly outpacing materials and labour, for example (Fig 18).

Fig 17: Attribution of 230% cost inflation in the GoM, between 2000-2012



Source: Redburn, company

Fig 18: Cost inflation for subsea equipment components, 2005-2013



Source: Redburn, company

The solution to such inefficiency is beginning to take shape. The offshore oil service companies are consolidating and seeking earlier, deeper involvement in project design and concept selection. Over time, the aim is to move offshore procurement from a competitively-bid, customer specified approach, to a ‘design competition’ where only a loose project specification is provided and the Oil Services chain responds with its cheapest, most stream-lined solution. The major alliances and joint ventures announced to date are summarised in Fig 19.

Fig 19: Major Oil Service mergers and joint ventures

Company	Expertise	Type	Announced
McDermott	Offshore engineering & installation (SURF)	Joint advisory services	January 2015
GE Oil Services	Subsea (SPS & flexibles) and surface (wellheads, turbines) equipment		
Technip	Offshore engineering & installation (SURF)	JV followed by full	Mar-2015 (JV),
FMC	Subsea equipment (SPS)	corporate merger	May-16 (merger)
Schlumberger	Reservoir technology, information services and subsea equipment	Joint venture	July 2015
Subsea 7	Offshore engineering & installation (SURF)		
Schlumberger	Reservoir technology & information services	Full corporate merger	August 2015
Cameron	Subsea equipment (SPS)		
Saipem	Offshore engineering & installation (SURF)	Co-operation agreement	December 2015
Aker Solutions	Subsea equipment (SPS & umbilicals)		
National Oilwell Varco	Topside equipment, mooring systems, drilling packages	Integrated FPSO solutions	July 2016
GE Oil Services	Subsea (SPS & flexibles) and surface (wellheads, turbines) equipment		
Baker Hughes	Drilling, logging & completion services	Full corporate merger	October 2016
GE Oil Services	Subsea (SPS & flexibles) and surface (wellheads, turbines) equipment		

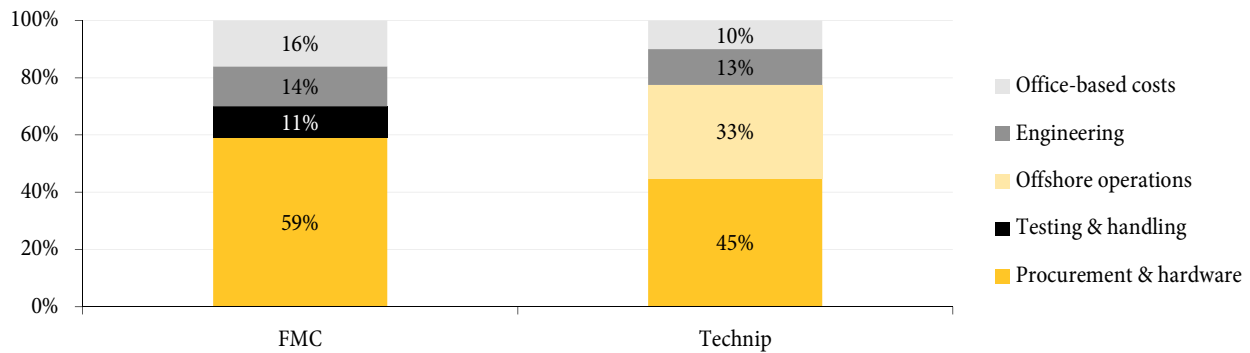
Source: Redburn, company

Two distinct approaches share common goals. The first is to bring together subsea equipment manufacturing and installation. Technip & FMC are the most advanced, having announced a full corporate merger. This approach saves 30% of the cost of an offshore package, removing \$6/bbl from a typical deepwater breakeven.

As we explored in detail in our August report 'Splendid Integration', some of the deflationary potential comes from earlier engagement in concept selection, and the

removal of duplicated engineering. The main contribution though comes from removing overlap in engineering and fabrication (Fig 20). For example, testing costs can fall by half given the closer involvement and greater familiarity between the subsea equipment manufacturer and the installer. Simple corporate cost reduction measures, such as consolidating back office activities, will also play a part.

Fig 20: Side-by-side break-down of main cost components, FMC & Technip



Source: Redburn, company

Second, large-cap US Oil Services adopted a different approach: Instead of combining equipment with installation services, their approach is to combine the equipment with down-hole services and reservoir expertise. This is the industrial rationale for the tie-up of Schlumberger with Cameron and of Baker Hughes with GE's Oil Services arm.

The industrial logic is the same: Backwards integration into high value-add services brings the contractor closer to the customer. The prognosis for this type of Oil Service offering is more positive than in the more fragmented, short-cycle service discussed earlier. In principle, the customers are being asked to transfer *more* responsibility to these larger technology-led operators rather than less.

Oil Majors are improving their procurement processes

In conclusion, it is positive to see evidence of the industry's rationalising its procurement processes, via democratization and integration. On a lesser scale, we also find increasing evidence that Oil Majors are improving their model to ensure contracts are competitive, while eliminating un-necessary contracting and sub-contracting:

(1) Greater cost-benchmarking to ensure competitiveness

First, companies have alluded to a greater degree of benchmarking, to ensure they are obtaining value-for-money in their contracts (quotes are summarised in Fig 21). Shell gave an example of recent benchmarking revealing £1,000 per square meter costs to paint its platforms, which was quickly addressed. Likewise, BP started benchmarking every well in its global drilling portfolio, aiming for top quartile performance.

Fig 21: Majors' comments on procurement practices

Major	Speaker	Date	Quotation
Shell	Ben van Beurden, CEO	04-Feb-16	"We worked very hard on significant cost take-outs... reviewing 7,000 contracts in our contracting and procurement department... representing about 80% of the Upstream project spend"
Shell	Ben van Beurden, CEO	8-Nov-16	"We have over the last few years reduced spending in shales to some \$2bn pa... and we have vigorously gone after cost reduction in a very systematic way through benchmarking and focus on what things should cost... overall we reduced our operating costs 35% and our well costs 50-60%"
Shell	Ben van Beurden	03-Nov-16	"The focus that we have is on productivity metrics... understanding what do I get from my dollar "
BP	Bernard Looney, Upstream CEO	02-Feb-16	"Capital productivity is about real, sustainable competitiveness, benchmarking ourselves continuously and striving to drive costs back to what they were when oil was last \$40"
Exxon Mobil	Rex Tillerson, CEO	02-Mar-16	"Our global procurement organization is dedicated to capturing the lowest lifecycle cost for goods and services. And as you can see by the graphic, we are achieving significant market savings"
Chevron	Joe Geagea, VP	29-Apr-16	"We're also continuing to take advantage of our size and scale. In a different part of the world, we are coordinating contract awards with one supplier across three different regions"

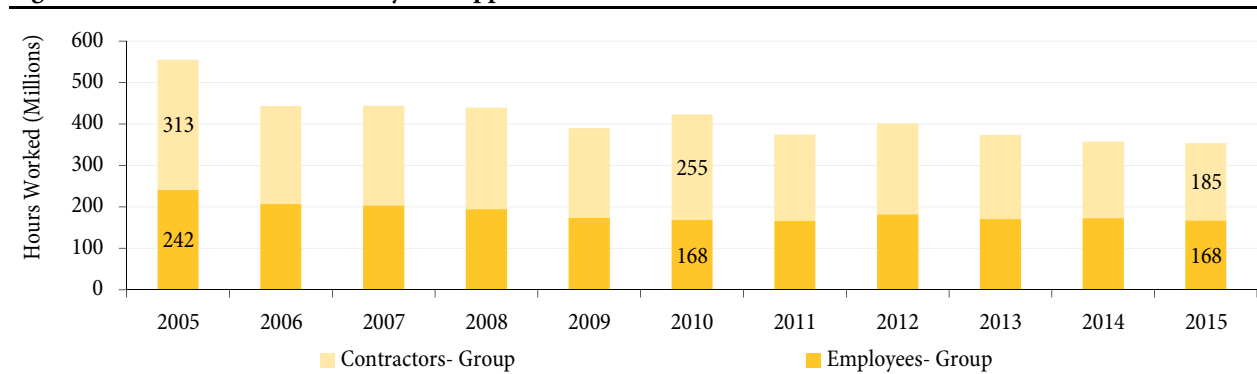
Source: Companies, Redburn

(2) Unbundling: Eliminate duplicate margins (and pay them to your shareholders)

Companies are also unbundling contracts in some instances, to cut out excessive sub-contracting, where the work could be more effectively conducted in house (Fig 22). As a further example, BP worked 353M man-hours in 2015, of which 52% was carried out by contractors, down from 60% in 2012 (Fig 23). Although it would still be pleasing to see this trend accelerating.

Fig 22: Majors' comments on procurement practices

Major	Speaker	Date	Quotation
BP	Bernard Looney, Upstream CEO	Dec-14	BP achieved a \$65M saving at Prudhoe Bay in Alaska through their own valve-procurement, which was previously being sub-contracted at a higher cost.
Chevron	John Watson, CEO	Jun-16	At the \$37bn Tengiz expansion project "the project team and principal contractor have been integrated into one team with fewer layers of management, lower cost and more effective leadership".
TOTAL	Patrick Pouyanné, CEO	22-Sep-16	"In many of our operations, we had too many contractors, working on [small activities]... We've reduced by 2/3 the number of contractors on our core crews ... since 2014...saving \$100M per year."
BP	Bob Dudley, CEO	02-Feb-16	"Our total Upstream workforce is now 20% smaller than it was in 2013, with 11% fewer employees and 48% fewer agency contractors." (Fig 23)

Fig 23: Number of hours worked by BP suppliers and contractors

Source: Companies, Redburn

(3) Economies of scale: Concentrating work across fewer, more extensive suppliers

In a recent survey by Achilles and IFF, 60% of Major oil company teams admitted not working collaboratively enough to manage supplier information. Instead that tackle due diligence tasks individually, repeating the same administrative processes on the same suppliers. Hence it is positive that we now see companies adopting more collaboration to streamline contracting processes by sharing more data and using the same suppliers for more work, when the consequence is a lower cost per unit of work.

Fig 24: Majors' comments on procurement practices

Major	Speaker	Date	Quotation
TOTAL	Patrick Pouyanné, CEO	22-Sep-16	"About \$15bn [of \$30bn total] could be jointly procured between at least two businesses or more. What we are doing today as joint procurement is only \$2 billion. So there is obviously a great opportunity for purchasing for discounts, I would say, and efficiencies"
Chevron	Joe Geagea, VP	29-Apr-16	"We're also continuing to take advantage of our size and scale. In a different part of the world, we are coordinating contract awards with one supplier across three different regions"
Shell	Ben van Beurden, CEO	03-Nov-16	"In procurement, we were able to broaden the [BG] synergies leveraging Shell's global supply chain reach using the enterprise framework agreement that we had"

Source: Companies, Redburn

In conclusion, the reforms discussed in Fig 21, Fig 22 and Fig 24 are encouraging. They show that the industry is starting to change the way it interacts with the supplier-base, rather than simply pressuring down the headline costs of individual prices. This matters because headline contract rates are likely to re-inflate with future oil prices. However, long-standing reforms to the companies' operating models should persist. Where the change could be most persistent – perhaps structural – is in the adoption of new digital procurement platforms, that totally transform the ability to maintain supplier relations, screen costs and conduct diligence on suppliers.

How Oil Majors' Procurement Models Differ

The different Majors' procurement models are summarised in Fig 25. All of the Super-Majors have global procurement teams comprising several thousand employees. However, this still begs the question why some of these Majors are leaning so heavily on 'framework agreements' with preferred suppliers. There is more room for improvement here.

In spite of this backdrop, BP stood out from our review of procurement models. It is the only Super-Major using RigUp and it is also using FPAL.

Making suppliers pay for the privilege. Shell has a unique model. Shell Contracting and Procurement is responsible for nearly everything that the entire company buys, across three major segments in 70 different countries. But we would be fascinated to know more about into its effectiveness: The company forces most suppliers to subscribe to its Supplier Qualification System (SQS), by paying a three-year subscription fee between \$1,700 - \$3,285 (supplies deemed "low risk" are exempt). As a result, we noted in Fig 3 that Shell had half of the number of suppliers as similar-sized peers (Exxon and TOTAL), which suggests more sub-contracting, potentially to

bypass its platform. On the other hand, Shell also appears to have the largest proportion of procurement personnel of any Major, at >10% (Fig 4).

Other Majors should accelerate their adoption of digital procurement platforms.

Adversity to change and procrustean standards are still getting in the way. For example, in 2015, the CIO of another Fortune 100 company refused to adopt any digital contracting model that could not be backed-up on CD-roms.

Fig 25: Summary of different oil Majors' procurement policies

Company	Procurement Policy
Exxon	A 'global procurement organization' is dedicated to capturing the lowest lifecycle cost for goods and services. It comprises 2,600 people, in 37 countries, managing \$55bn of spending pa using an SAP-Ariba invoice management system.
Shell	"Shell Contracting and Procurement" is responsible for nearly everything that the entire company buys, across three major segments in 70 different countries. The company adopted an Achilles platform in 2011, forcing most suppliers to subscribe to pay a three-year subscription fee between \$1,700 - \$3,285 to Achilles for registration.
BP	Functional re-organization includes specialised procurement division
TOTAL	Created a new segment, "TOTAL Global Services", in a 2016 restructuring to improve efficiency across all businesses by pooling support activity: one are is purchasing. Each segment has its own purchasing department, overlain by a corporate purchasing department.
Chevron	Supplier-engagement appears to be managed regionally, rather than through a global procurement organization. Manages suppliers through an eProcurement website run by SAP Ariba.
Statoil	Separates procurement into five departments: Drilling, energy-retail, business support, O&M, projects. Suppliers must pre-qualify to participate in Statoil tenders, but the company also uses digital platforms such as Achilles and Fluid Contracts.No and the technical requirements for pre-qualification have also been simplified and standardised, saving time.

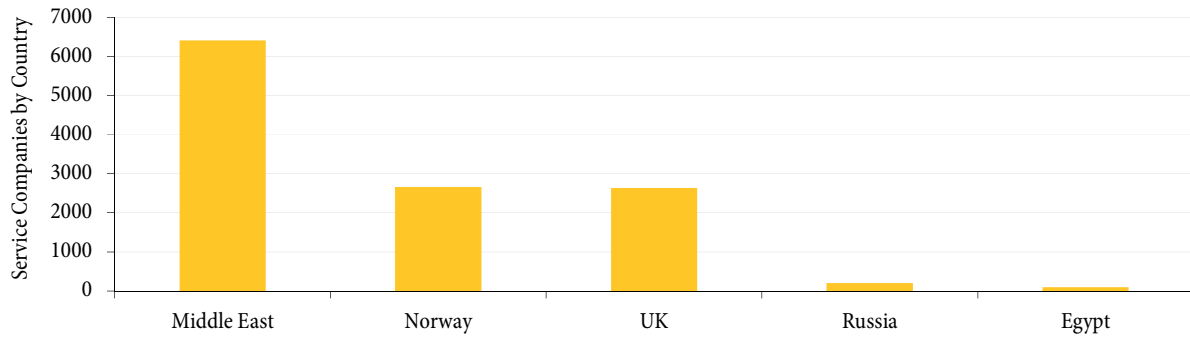
Source: Companies, Redburn

Where can digital procurement expand to collapse cost?

Overall, we think the industry could be ripe for continued deployment of digital procurement platforms, perhaps via expanding today's platforms to new geographies. The first port-of-call would be fragmented Service markets, such as the UAE, Iran and Qatar (Fig 26). Second, just as FPAL has lowered the barriers to entry for new suppliers in the UK North Sea - improving competition – the same effect could be triggered in international oil and gas markets. This matters because Fig 27 summarises the average spend per supplier, across 26,600 suppliers that composed Eni's €42bn of procurement costs in 2014: Compared with an average of €1.6M, Africa and Asia had 2-6x larger contracts, implying larger turnkey agreements; while the Americas, Europe and Oceania contract sizes tended to be 20-50% below-average, implying deeper Services markets and more competition.

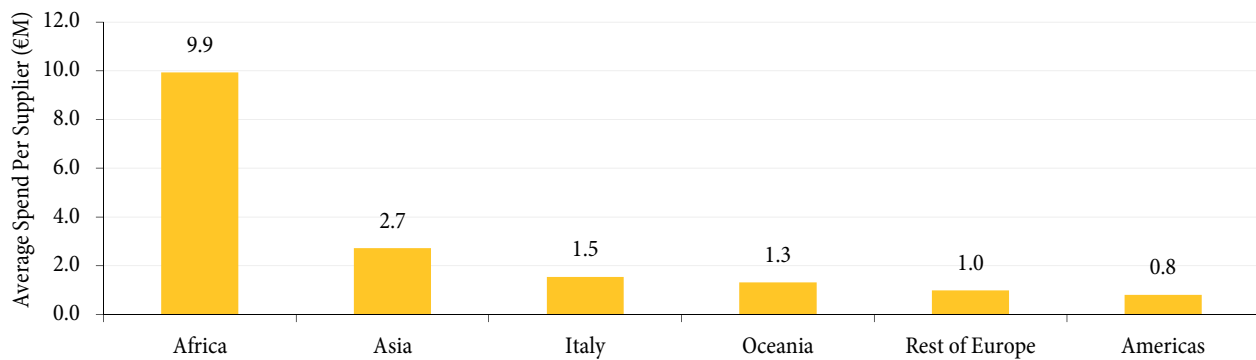
We also find that projects components have been most competitively priced in the US and Brazil (Fig 28), i.e., easy-to-operate countries with deep supply chains. Here, 40% of projects were contracted at prices that were >25% cheaper than their peers' over the same three-year period. Conversely, companies operating off West Africa were most likely to overpay for services, relative to peers: c60% of contracts in Angola and 50% of contracts in Nigeria were more than 10% more expensive than peers'. North Sea countries, such as the UK and Norway, screened as mid-table.

Fig 26: Number of Oil Service providers in different international markets



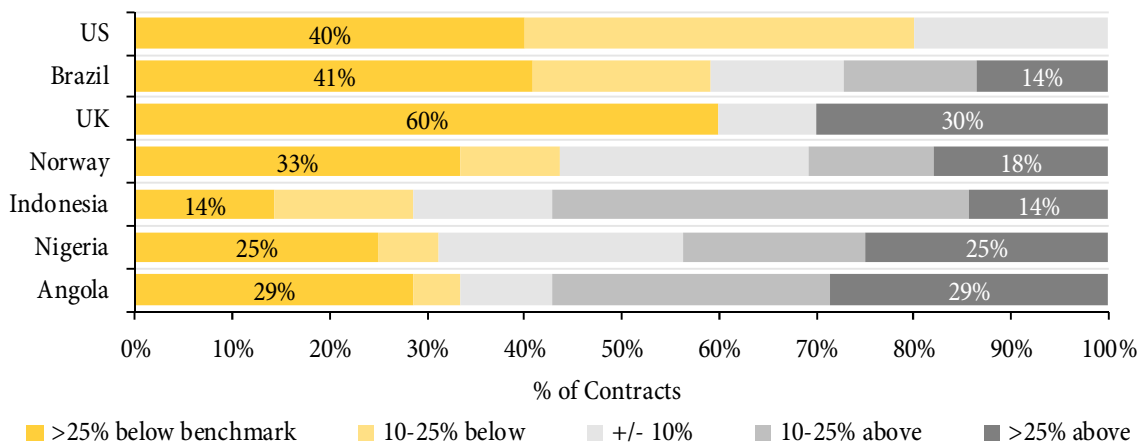
Source: Oil and Gas Directory, Achilles, Redburn

Fig 27: Eni's average spend across 26,600 suppliers



Source: Companies, Redburn

Fig 28: Percentage of contracts by region that are priced above or below comparable contracts



Source: company reports, Redburn

A Major opportunity: Dis-intermediate & integrate procurement

Our conclusion is that the industry is starting to tackle its procurement processes, rather than simply pressuring contract prices lower. This finding is a clear positive for Oil Major investors, particularly because the trend towards dis-intermediating and integrating procurement processes is only just starting. On the other hand, it is less positive for the sector that today's share prices require the companies to achieve c30% further cost reductions relative to the trajectory of the forward oil price, so our work should be seen merely as de-risking today's valuations, rather than offering incremental upside. For the Services the benefits are clearer-cut. Tenaris is benefitting most directly from the disintermediation of the supply-chain while Technip is benefitting most directly from its integrated subsea offering. We rate both shares as Buys. Our outlook on Oil Majors is more cautious. Statoil is rated as Buy, while we have a relative preference for BP (rated Neutral using forward curve oil prices), whose procurement process reform appears top of the pack.

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