

VALUE CREATION IN ECS

SEIZING CONTROL OF THE CYCLE



BCG

THE BOSTON CONSULTING GROUP

The Boston Consulting Group (BCG) is a global management consulting firm and the world's leading advisor on business strategy. We partner with clients from the private, public, and not-for-profit sectors in all regions to identify their highest-value opportunities, address their most critical challenges, and transform their enterprises. Our customized approach combines deep insight into the dynamics of companies and markets with close collaboration at all levels of the client organization. This ensures that our clients achieve sustainable competitive advantage, build more capable organizations, and secure lasting results. Founded in 1963, BCG is a private company with 78 offices in 43 countries. For more information, please visit [bcg.com](https://www.bcg.com).



VALUE CREATION IN ECS

SEIZING CONTROL OF THE CYCLE

JEFF HILL

DANNY FRIEDMAN

JODY FOLDESY

CONTENTS

- 3 EXECUTIVE SUMMARY
- 7 THE TOP VALUE CREATORS
 - Ten Years of Extremes
 - What's in Our Sample
 - The Ten-Year Findings
 - No Single Recipe for Success
 - The Role of Business Models
- 15 THE CONTINUING TOLL OF THE GLOBAL FINANCIAL CRISIS
 - Who Got Squeezed
 - The Coming Shakeout
- 16 HOW THE WINNERS DID IT
 - Five Trends Shaping the Industry
 - The Capital Discipline Advantage
- 28 EMERGING THEMES AND RECOMMENDATIONS
 - The Lessons in the Numbers
 - Seizing Control of the Cycle
- 31 FOR FURTHER READING
- 32 NOTE TO THE READER

EXECUTIVE SUMMARY

MAJOR PLAYERS IN THE engineering, construction, and services (ECS) industry have experienced massive swings in performance over the past ten years and delivered shareholder value with widely varying degrees of success. We have studied their performance and found clear patterns that they can use to better navigate the changing landscape and improve their chances of delivering superior returns to shareholders in the coming years.¹

Value Creation in ECS: Seizing Control of the Cycle examines the total shareholder returns (TSRs) of 42 ECS companies over the past ten years. The report is based on The Boston Consulting Group's fourteenth annual report in the Value Creators series, *Improving the Odds: Strategies for Superior Value Creation*. The series provides detailed empirical rankings of the world's top value creators and distills managerial lessons from their success. It also highlights key trends in the global economy and world capital markets and describes how those trends are likely to shape future priorities for value creation. Finally, the series shares BCG's latest analytical tools and client experiences to help companies better manage value creation.

In the wake of the worst financial crisis since the 1930s—a crisis that played a huge role in ECS performance and influenced many industry changes—ECS leaders must come to understand the forces at play and how different companies have successfully (or unsuccessfully) responded and adapted to those forces. In this report, we offer lessons to help those leaders improve their business, financial, and investor strategies, and we raise 15 key questions that should be on the mind of every ECS executive today.

Over the past ten years, the ECS industry has performed incredibly well. The 42 companies in our sample delivered annual returns of almost 16 percent on a weighted average basis. To put that in perspective, the overall sample would have qualified for the top quartile in the S&P 500 over that period.

- But this performance masks the pain that ECS companies have felt over the past five years, when ECS has been the second-worst performing sector, with shareholder returns of –9 percent. Not only has growth slowed, but valuation multiples have also dropped substantially and are well below those of the S&P 500—and they could remain there for some time.
- Through the upheaval of recent years, top-quartile ECS companies (in aggregate) have delivered with regard to each of the major drivers of TSR: they have grown at double-digit rates (clearly using M&A as a major source of revenue growth), expanded profit margins and valuation multiples, and made a positive contribution of free cash flow—meaning that they have been paying down debt, paying out dividends, and issuing relatively few new shares to reward employees and fund growth.

There were clear differences in performance characteristics among the industry’s various business models. Process engineering, procurement, and construction (EPC) companies and design and engineering companies delivered the best TSR performance over the past ten years and weathered the downturn the best during the past five years.

- Infrastructure construction companies suffered during the financial crisis: their primary sectors were hit hard, and they could not scale back their resources to compensate. Concessionaires, which invested capital against lofty revenue projections made during the boom years, were hit the hardest when those projections failed to pan out.
- That said, performance of all the business models varied substantially, illustrating that ECS companies can’t simply pick the “right” one and assume that improved TSR performance will follow.

The financial crisis affected more than just ECS performance and outlook—it changed how and where companies compete.

- Many companies moved downmarket, bidding on smaller projects. We expect the consequences of the crisis to continue to reverberate even as the global economy rebounds.
- Other companies expanded into new markets that are still reeling from the fallout of the economic crisis.

Five powerful trends have played major roles in ECS shareholder value creation. ECS executives should understand the implications of those trends for their companies.

- *Scale matters.* The biggest infrastructure projects (such as roads, bridges, water storage, and conveyance) are much bigger than they have ever been (smaller infrastructure projects are staying more or less the same size). This trend toward megaprojects favors large ECS players, which alone are capable of mobilizing

and completing such large-scale undertakings. Scale also matters on a sector basis: aggregating ten weak positions is not as effective as building a business around two or three strong positions.

- *M&A matters.* ECS relies on M&A to deliver shareholder returns more than other industries do. The clear, powerful basis for revenue synergies in ECS—the ability to cross-sell services, capabilities, and technologies into new markets or project types—is shared by few other industries. Although cross-selling synergies often are overestimated in M&A deals, they form a sound basis for deals in ECS.
- *Competitive threats have emerged.* Korean companies have emerged as global competitive threats, with distinct cost advantages and ready access to high-growth markets. Spanish companies have aggressively pursued greenfield infrastructure markets in southern Europe still dogged by the financial crisis. And Chinese companies are serious challengers as well. Organizations with specialized and differentiated capabilities are best positioned to withstand these threats and maintain pricing power.
- *U.S. dominance is ending.* For the first time since BCG began tracking TSR in the industry, U.S. companies failed to make it into the top performance quartile. In their place are companies that have leveraged their proximity to fast-growing regions or parlayed their dominance in local markets into superior shareholder value creation.
- *The threat of volatility is omnipresent.* Exposed as they are to fluctuations in commodity prices, ECS companies must carefully weigh pricing and risk-management considerations when bidding for contracts. Disciplined pricing capabilities, size, and diversification are key defenses against cost overruns and sector downturns.

Capital discipline has emerged as a critical driver of shareholder returns in ECS.

- Investors reward companies that minimize asset intensity (that is, the dollars of capital required to deliver a dollar of sales or profits), use debt wisely, and are willing and able to pay consistent dividends and increase them over time.
- Top-performing value creators used substantial portions of their capital to pay dividends—maintaining, or even increasing, quarterly dividends through the darkest days of the economic crisis.

There is no simple formula for success, but ECS executives can dramatically improve their odds of creating superior shareholder value by focusing on a few key lessons.

- Reach a sustainable scale—at the company level and on a sector-by-sector basis.

- Build world-class M&A capabilities.
- Maintain capital discipline and return cash to shareholders.
- Become cost competitive to counter emerging global challengers.
- Focus on differentiation and innovation.

NOTE

1. Engineering, construction, and services (ECS) is our preferred term for what is commonly referred to as the engineering, procurement, and construction (EPC) industry. We believe that the EPC framework does not adequately capture the full spread of industry activities and business models, which run the gamut from original equipment manufacturers at one end of the value chain to operators at the other. Between those poles fall the industry's core business models: process EPCs, design and engineering, infrastructure construction, and concessionaires. Those four models are the focus of our analysis, which is based on empirical data and BCG's methodology for assessing TSR and its key drivers.

THE TOP VALUE CREATORS

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way—in short, the period was so far like the present period that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.

—Charles Dickens,
A Tale of Two Cities (1859)

ALITTLE MORE THAN 150 years ago, at the outset of his landmark novel, Charles Dickens joked about his contemporaries' tendency to describe their era in superlatives. Executives in the engineering, construction, and services (ECS) industry have probably found themselves using just such superlatives over the past ten years—but this time it's no joking matter. The industry had an amazing run during the first few years of the twenty-first century, powered by brisk growth in global infrastructure and widespread credit expansion, but it has been hit hard by the financial crisis and its lingering fallout. Government budgets in the developed world have been slashed, private buyers have reined in spending as they await greater economic certainty, and once-secure

ECS players have been forced to compete with one another more intensely than ever before.

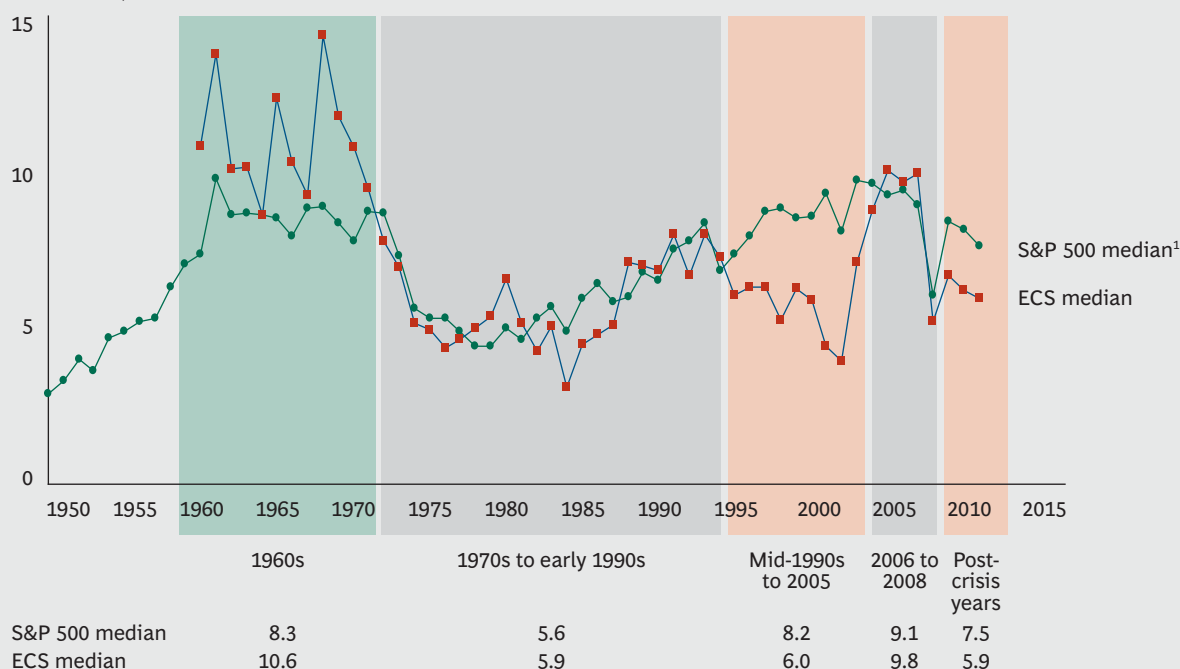
Ten Years of Extremes

BCG's latest assessment of global shareholder returns by industry sector confirms that ECS has indeed seen both the best and the worst of times. The industry experienced stellar performance in the first five years of our observation period (from 2002 to 2007), as credit expanded, commodity prices boomed, and a global build-out of infrastructure (such as roads, bridges, and water storage and conveyance) gained steam. In fact, our analysis of ECS valuation multiples—dating back to the 1950s—shows that a ten-year period of relative undervaluation for ECS came to an end in 2005, and the industry was, for a brief period of time, valued above the S&P 500. (See Exhibit 1.)

This run-up helps explain why the average annual total shareholder return (TSR) for the 42 ECS companies in our sample was almost 16 percent from 2002 to 2012. Even including the subsequent downturn, our sample delivered top-quartile returns when compared with the S&P 500—meaning that investors would have been better off holding a basket of our 42 stocks (weighted by starting market cap) than putting the same amount of money into any one stock among

EXHIBIT 1 | The ECS Industry's Median Value Has Trailed the S&P 500's Since the Mid-1990s

Ratio of enterprise value to EBITDA



Sources: Compustat; BCG analysis.

¹Prior to 1993, the S&P median was based on the implied index of the top 500 companies as determined by market capitalization.

the lowest-performing 75 percent of the S&P 500. Put another way: Any individual company should be proud to be a top-quartile performer; that an entire industry was in the top quartile is a ringing statement of outperformance.

But as any ECS executive can tell you, “out-performance” is absolutely the wrong word to describe the results of the past five years. Our sample delivered annual returns of –9 percent from 2007 to 2012, meaning that investors holding a basket of those stocks would have seen about one-third of their wealth destroyed over that period. (See Exhibit 2.) Only one industry—leisure goods, not surprisingly—performed worse than ECS over the same period. Indeed, even the maligned financial sector performed substantially better, delivering an annual TSR of –6 percent.

The question now is what sort of industry will emerge from the crisis. Will growth come back? Will rebounds in pricing and improved operations allow profit margins to grow? Will valuations return to previously high levels? The answers to these questions are unknown-

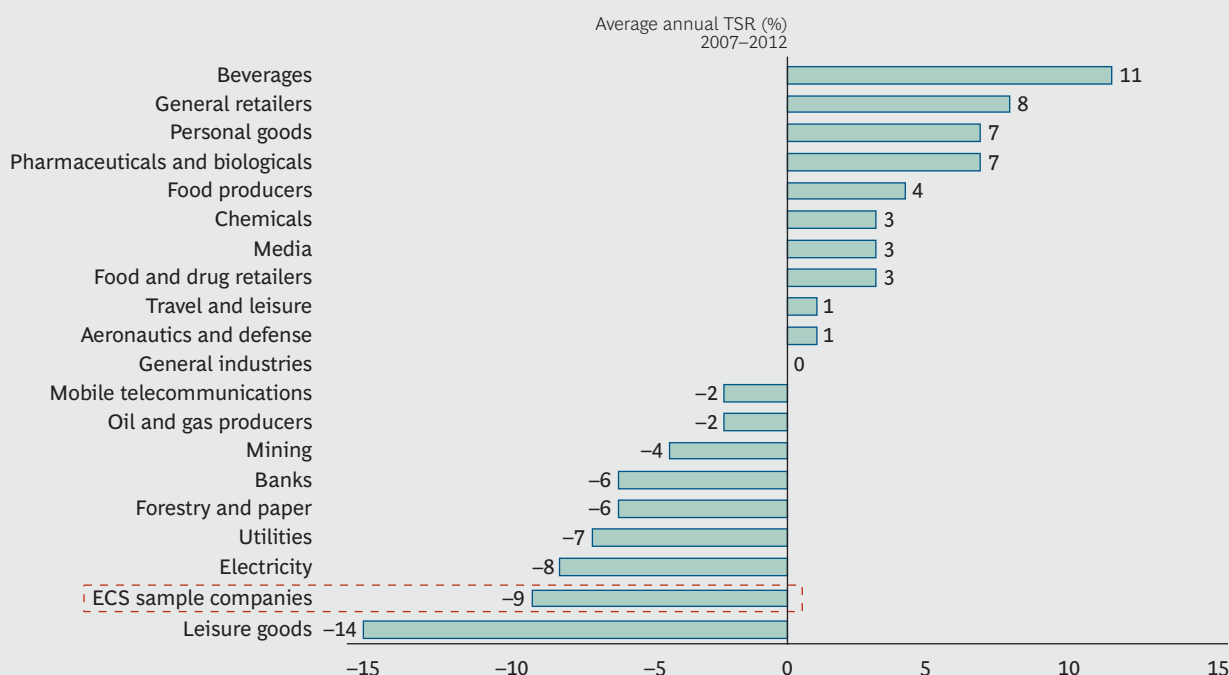
able at this point, but the macroeconomic forces that powered the industry’s rise before the financial crisis have by no means dissipated and may, in fact, be gathering renewed momentum.

What’s in Our Sample

We should note here why we refer to the engineering, procurement, and construction industry (EPC), as it is more commonly known, as the ECS industry. We believe that the EPC framework does not adequately capture the full spread of industry activities and business models, which run the gamut from original equipment manufacturers (OEMs) at one end of the value chain to operators at the other. Our ECS universe, therefore, comprises companies involved in every phase of nonresidential construction, from making power-generating and energy-extraction equipment; to designing and building roads, mines, wells, and factories; to operating and maintaining those plants and structures.

The ECS business models can be segmented into six distinct types. In between OEMs at one end and operators at the other fall the in-

EXHIBIT 2 | The Economic Downturn Hit the ECS Industry Hard



Sources: Thomson Reuters; S&P Capital IQ; BCG ValueScience Center.

Note: The indices, with the exception of ECS, are based on Thomson Reuters industry segments.

dustry’s core business models: process EPCs, design and engineering, infrastructure construction, and concessionaires. (See Exhibit 3.) Those four models are the focus of our analysis, which is based on empirical data and BCG’s methodology for assessing TSR and its key drivers.

We consider the companies that follow those models to be core ECS because they have many overlapping activities and clients, and they often compete directly against one another. In this respect, they differ markedly from operators, which typically do not engage in core design, engineering, or contracting activities and thus find themselves in less direct competition with the companies in our sample. We see the operators’ role in the value chain (managing existing power plants or infrastructure as a service) as distinct from the primary role of the core ECS companies. For these reasons, we excluded them from our analysis. We also excluded OEMs because, although they make the equipment that core ECS companies need to operate their businesses, they don’t typically compete with their customers for contracts. What’s more, OEMs are often part of indus-

trial conglomerates, so comparing them financially with freestanding companies is, in many cases, of limited value.

Among the core ECS companies, we concentrated on all publicly traded companies with at least \$500 million in revenues in 1997 and at least 15 years of capital market and publicly reported financial data. We excluded several companies because of limitations in, or questions about the quality of, their data.

The Ten-Year Findings

So how did the companies in our sample manage to post such enviable returns for ten years? They did it by overdelivering on virtually every metric in BCG’s TSR model. (See the sidebar “How We Calculate Total Shareholder Return,” page 12.)

By almost any measure, the ECS sector’s performance is impressive—or would be if the memory of the past five years weren’t so fresh and painful. Average annual revenue growth for the companies in our sample was nearly 11 percent, thanks in part to the glob-

EXHIBIT 3 | The Taxonomy of ECS Companies

Business model	Main sector	OEM	Design and engineering	Contracting and construction	Services and operation		
OEMs ¹	Power	Siemens	Alstom	ABB	Doosan	BHEL	Core ECS companies
Process EPCs ²	Power and industrial and gasoline		Larsen & Toubro	Shaw Group	SNC-Lavalin	Fluor	
			Samsung Engineering	GS E&C	Saipem	Technip	
Design and engineering	Industrial and gasoline		Tetra Tech	Arcadis	Fugro	URS	WorleyParsons
			Atkins	Jacobs	Amec	Pöyry	AF Group
Infrastructure construction	Transportation and general building		Acciona	Granite Construction	Bouygues	Layne	Skanska
			Hyundai Engineering and Construction	Shimizu	Lend Lease	Taisei Construction	Leighton Holdings
			Tutor Perini	Daewoo	Obayashi	Kajima	BAM
Concessionaires	Transportation and general building		Bilfinger	ACS	Abengoa	Vinci	Reliance Industries
			Balfour Beatty	Construcción	Obrascon	Eiffage	
Operators ¹	Power and transportation						EDF Atlantia

Sources: Engineering-News Record annual rankings; BCG analysis.
Note: Segmentation is based on revenue breakdowns.
¹The companies in the OEMs and Operators categories are offered as examples only. They were not included in the analysis for this report.
²“EPCs” indicates companies in the engineering, procurement, and construction industry.

al tailwinds that propel the industry and—just as important—the well-founded prevalence of M&A in ECS. (M&A is critically important in every industry, but ECS comprises a highly fragmented, typically locally relevant, set of players. Add in a generational aspect—many of these companies launched in the 1960s, which were boom years in the U.S.—and you have a fertile landscape for M&A. Furthermore, a powerful value-creation rationale for M&A exists in the ECS industry, as we describe in more detail below.)

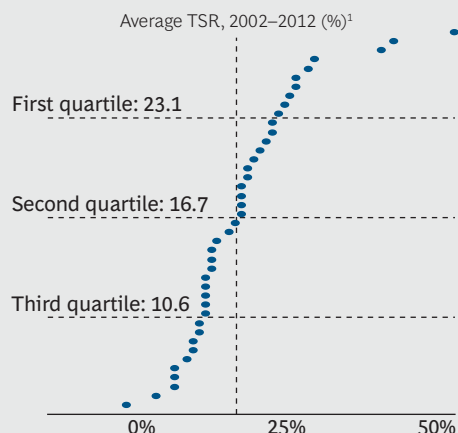
U.S. companies were shut out of the ranks of the best performers.

Meanwhile, the margins consistently expanded for our ECS sample companies at an average annual rate of 3 percent over the ten-

year period, for total annual profit growth of almost 14 percent. Valuation multiples also improved, at an average annual rate of almost 2 percent. The contribution of free cash flow (FCF) to TSR, however, was neutral overall. Our sample paid healthy dividends, yielding more than 3 percent on average—a surprising finding given the extraordinary growth profile that the industry enjoyed over this period. But these companies also leveraged up slightly over this period and issued more shares, negating the contribution of dividends to FCF. (See Exhibit 4.)

In a break from precedent, U.S. companies were shut out of the ranks of the best performers. Our top ten ECS companies are all internationally based: Samsung Engineering, WorleyParsons, Larsen & Toubro, AF Group, Arcadis, Atkins, Bilfinger, Amec, Technip, and Obrascon. (See Exhibit 5.) Samsung Engineering was the strongest performer. Its revenues increased from \$1 billion to \$10.6 billion over the full ten-year period—a compound annual growth rate of 27 percent—and it largely

EXHIBIT 4 | Our Sample Companies Have Delivered an Average TSR of Approximately 16 Percent Since 2002



Sources: S&P Capital IQ; BCG ValueScience Center.

Note: All underlying values are based on U.S. dollars.

¹Each of the 42 ECS companies is represented by a data point.

²Dividend contribution includes investment of dividends and special dividends, compounded monthly.

Fundamental value (%)	
Revenue growth	10.7
Margin change	3.1
Profit growth	13.8
Valuation multiple (%)	
Multiple change	1.9
Free-cash-flow contribution (%)	
Dividend yield ²	3.3
Share change	-2.8
Net debt change	-0.4
	0.1
Total weighted average	
	15.8

EXHIBIT 5 | The Top Ten Performers Are Based Outside the U.S.

Quartile	Company	TSR (%) =	Sales growth (%) +	Margin change (%) +	Multiple change (%) +	Free-cash-flow yield (%) +
First quartile	Samsung Engineering	52	27	-2	13	14
	WorleyParsons	42	43	-9	10	-2
	Larsen & Toubro	40	21	2	11	6
	AF Group	29	15	15	-3	2
	Arcadis	28	15	1	12	1
	Atkins	26	7	9	11	-1
	Bilfinger	26	12	4	9	1
	Amec	25	1	10	7	7
	Technip	24	9	5	3	8
	Obrascon	23	14	12	0	-3
Second quartile	GS E&C	22	12	-6	9	7
	Fugro	22	14	5	5	-2
	Saipem	21	20	-1	0	3
	SNC-Lavalin	20	15	3	1	2
	Hyundai Engineering and Construction	19	10	7	0	2
	Reliance Industries	18	23	-9	4	0
	Daewoo	18	10	-9	20	-3
	Skanska	17	2	2	2	11
	Leighton Holdings	17	23	-4	-2	0
	Vinci	17	10	4	3	0
Third quartile	Fluor	17	10	5	3	-1
	Eiffage	16	10	16	1	-11
	Abengoa	15	22	6	-4	-10
	ACS	13	28	-1	-6	-7
	Tutor Perini	12	13	10	10	-21
	Balfour Beatty	12	13	-3	5	-3
	Lend Lease	12	5	-5	11	0
	Layne	11	15	-2	2	-4
	Obayashi	11	5	4	-3	5
	Shaw Group	11	5	-3	9	0
Fourth quartile	URS	11	16	-2	3	-6
	BAM	11	12	-3	9	-7
	Granite Construction	10	2	-1	5	4
	Taisei Construction	10	3	-1	12	-4
	Jacobs	9	9	4	-3	-1
	Acciona	9	10	15	-11	-5
	Tetra Tech	8	11	-2	0	-1
	Bouygues	6	6	-1	1	0
	Kajima	6	1	11	-10	4
	Shimizu	6	4	-9	6	4
Fourth quartile	Pöyry	3	10	-19	15	-3
	FCC Construcción	-2	11	-4	0	-9

Sources: S&P Capital IQ; BCG ValueScience Center.

Note: All underlying values are based on U.S. dollars.

HOW WE CALCULATE TOTAL SHAREHOLDER RETURN

Total shareholder return (TSR) is the product of multiple factors. BCG’s methodology for determining TSR quantifies the relative contribution of the various sources of TSR, which, broadly speaking, include changes in fundamental value, shareholder expectations, and the distribution of free cash flow. (See the exhibit below.) The methodology uses the combination of sales growth and change in margins as an indicator of a company’s improvement in fundamental value. It then uses the change in the company’s valuation multiple to determine the impact of investor expectations on TSR. Together, these two factors determine the change in a company’s market capitalization. Finally, the model tracks the distribution of free cash flow to investors

and debt holders in the form of dividends, share repurchases, or repayments of debt in order to determine the contribution of free-cash-flow payouts to a company’s TSR. All those elements interact, sometimes in unexpected ways. A company may increase its earnings per share through an acquisition and yet not create TSR because the new acquisition has the effect of eroding the company’s gross margins. And some forms of cash contribution (for example, dividends) have a more positive impact on a company’s valuation multiple than others (for example, share buybacks). Because of these interactions, we recommend that companies take a holistic approach to value-creation strategy.

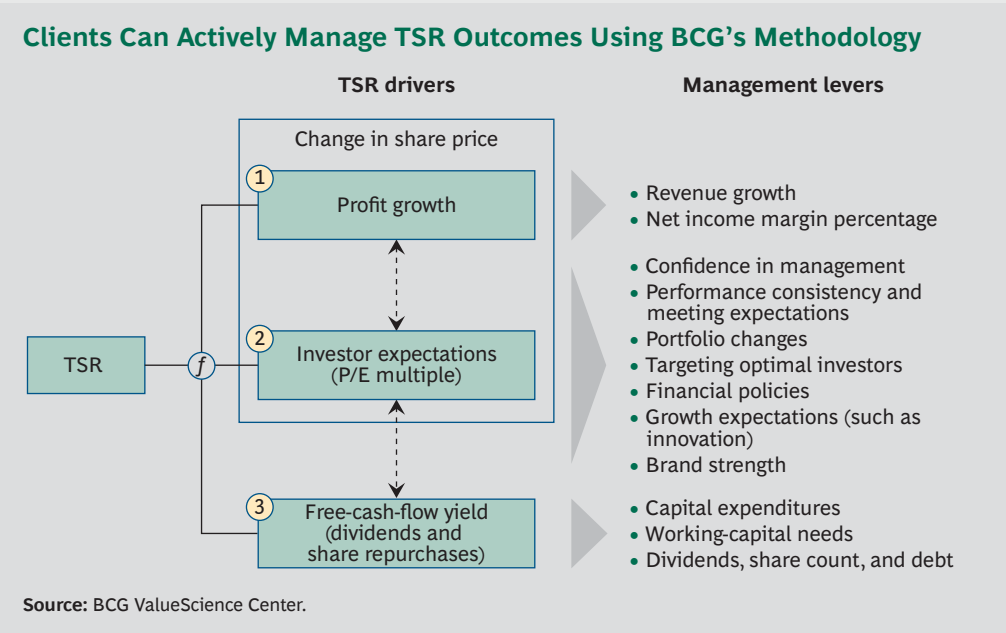
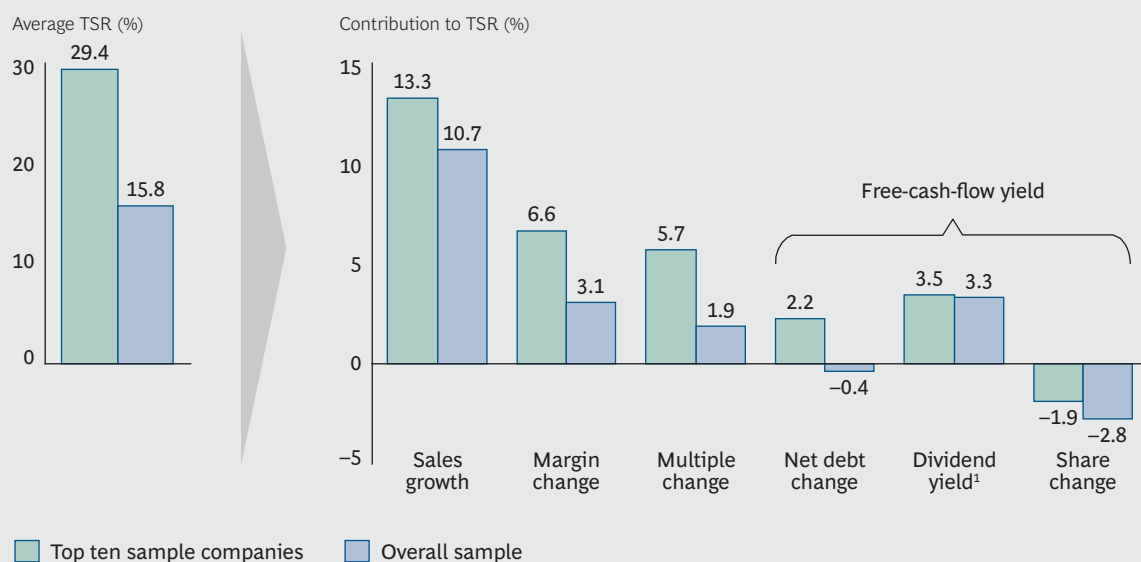


EXHIBIT 6 | The Top Ten Companies Outperformed on Every Value Lever



Sources: S&P Capital IQ; BCG ValueScience Center.

Note: All underlying values are based on U.S. dollars.

¹Dividend contribution includes investment of dividends and special dividends, compounded monthly.

No Single Recipe for Success

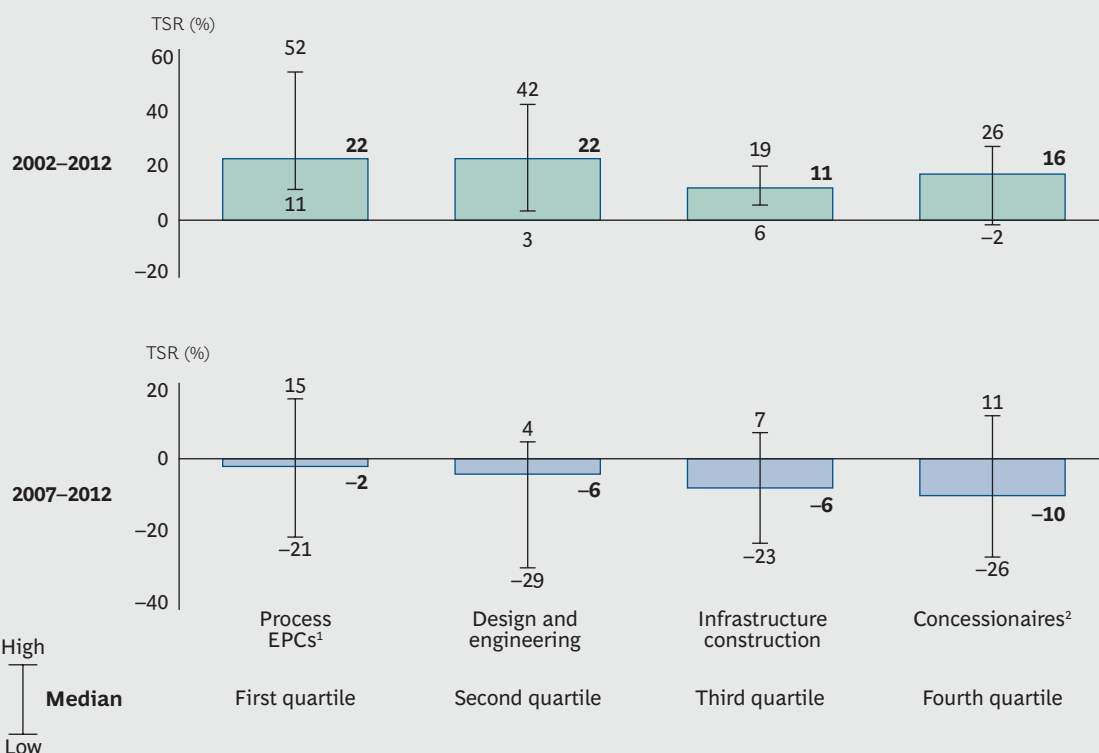
It is important to remember that value creation in any industry, but particularly in ECS, is not a simple paint-by-numbers exercise. ECS companies can be found in widely varying locations, with divergent business models and distinct capabilities, and they deliver their superior TSRs by a variety of means. WorleyParsons, for example, turned in 43 percent annual sales growth but did so by sacrificing profit margins to a certain extent. Amec, by contrast, shifted away from construction. As a result, its sales rose only 1 percent, yet its margins and valuation multiple both expanded at a healthy clip. Technip had the most balanced contributions to TSR (9 percent revenue growth, 5 percent margin expansion, 3 percent improvement in valuation multiple, 8 percent FCF contribution), while Samsung Engineering and Arcadis benefited the most from expansion in their valuation multiples, which grew by 13 percent and 12 percent, respectively.

The Role of Business Models

The choice of business model, as one might expect, greatly affected TSR performance over the past ten years. (See Exhibit 7.)

- Process EPCs posted the highest median ten-year TSRs, at 22 percent, and held up the best during the downturn, with a median 2 percent annual loss of shareholder value over the past five years. They also showed the widest variations in results, with ten-year TSRs ranging from 52 percent to 11 percent, and five-year TSRs ranging from 15 percent to -21 percent. This is a logical outcome of the process EPCs' exposure to the boom-bust cycles associated with commodities and the discovery nature of upstream projects related to mineral extraction.
- Design and engineering companies also delivered 22 percent TSR over ten years but -6 percent over the past five years. As more-or-less pure service businesses, they have a greater ability to ratchet resources up and down to meet demand, which accounts in part for their relatively low volatility over the ten-year period.
- Infrastructure construction companies were hardest hit in the downturn, posting a median TSR of -6 percent. That showing sapped their ten-year performance (11 percent), which on average barely bettered the S&P 500 median (10 percent).

EXHIBIT 7 | Process EPCs Represent the Best-Performing Business Model



Sources: S&P Capital IQ; BCG ValueScience Center.

Note: All underlying values are based on U.S. dollars.

¹EPCs¹ indicates companies in the engineering, procurement, and construction industry.

²Includes activities such as operations and maintenance.

- Concessionaires delivered the worst median TSR outcomes over the past five years (–10 percent), an unsurprising outcome given that those companies invested in projects during the boom years but then collected revenues (such as highway tolls) on them during the crisis years.

Business model choices are strategically significant because they influence the types of projects that a company might engage in. Process EPCs, for instance, tend to concentrate on oil and gas and other extraction-based projects, currently one of the industry's most attractive growth areas. The choice of business model also dictates how much capital a business may require. Infrastructure construction companies, for

example, typically incur massive materials costs, with significant implications for their margins, capital intensity, and (potentially) exposure to risk.

Nevertheless, business models are *not* deterministic. The variation of results within each model was typically two to nearly four times greater than the variation of results among the models. For example, the median TSR for the four business models varied from 11 percent for infrastructure construction to 22 percent for process EPCs over the ten-year period. But within each respective business model, the ten-year TSR varied by 41 percent (process EPCs), 39 percent (design and engineering), 13 percent (infrastructure construction), and 28 percent (concessionaires).

THE CONTINUING TOLL OF THE GLOBAL FINANCIAL CRISIS

THE GLOBAL FINANCIAL CRISIS clearly had a profound impact on the ECS sector and the shareholder returns of its leading players. In the U.S., nonresidential-construction growth turned negative, as government-sponsored projects—primarily infrastructure contracts—fell victim to budget cutbacks, and hard-pressed commercial customers shelved construction plans. The ensuing competitive scramble for the relatively few contracts that were funded (many at lower levels than anticipated) drove down prices and blurred many of the traditional lines of competition in the ECS industry.

Who Got Squeezed

The companies hit hardest by the shakeout were those that historically have relied on government funding for the bulk of their revenues, notably companies that focus on infrastructure projects and companies whose revenue growth is predicated on overall economic growth (such as concessionaires and companies with more general skills or

technical expertise). Midsize generalists in particular have suffered from the dearth of new business, finding themselves squeezed between larger companies that have moved downmarket in search of new revenues and smaller specialists whose distinctive capabilities have enabled them to continue winning new bids.

The Coming Shakeout

A former engineering and construction executive now working in private equity recently observed, “It’s the small- to mid-cap companies that have been hurt the worst. The bigger guys have moved down to take the small projects. The very small companies with niche capabilities do OK. It’s the middle that gets hurt.” The assessment of a former senior executive in the ECS industry was even more stark: “There are a lot of smaller, midsize companies out there that can’t make it or aren’t going to make it. They can either go out of business or seek relief in a white knight.”

HOW THE WINNERS DID IT

THE PROFOUND AND ENDURING impact of the global financial crisis does not fully account for the performance of the ECS industry over the past ten years.

Five Trends Shaping the Industry

Through our analysis and our work with many ECS companies, we have identified five powerful trends that have been critical in separating the winners from the losers: the unique importance of scale, the increased significance of M&A, the emergence of new competitive threats, internationalization, and a rise in volatility.

THE GROWING IMPORTANCE OF SCALE

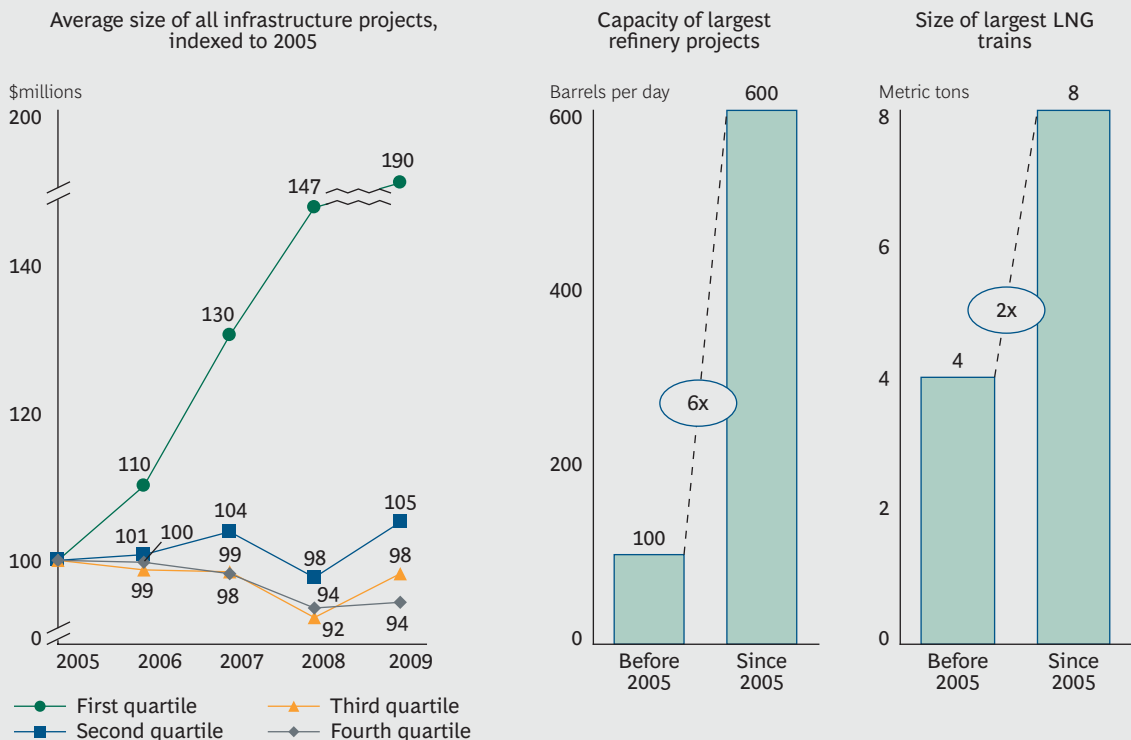
Our analysis suggests that the biggest infrastructure projects are bigger than ever before, while smaller infrastructure projects are staying more or less the same size. (See Exhibit 8.) This finding is related to the growing prevalence and size of megaprojects around the globe—massive mining and oil and gas projects in previously inaccessible regions and the enormous infrastructure projects that provide ingress and egress to these sites or otherwise pave the way across remote areas, such as North Africa. On an indexed basis, the average top-quartile project initiated in 2009 was almost twice as large as the average top-quartile project initiated in 2005. The largest refinery projects have grown by a factor of about six, while the largest liquified natural-gas trains have approximately doubled.

The trend toward megaprojects favors large ECS companies, which alone are capable of mobilizing and completing such large-scale undertakings. By virtue of their size and financial strength, they also have an advantage in recruiting and acquiring the best talent. That advantage, in turn, reinforces their position when competing for megaprojects.

Further evidence of the crucial importance of scale can be found in the market shares of the top 500 design companies, according to the *Engineering-News Record* (ENR), the industry's primary periodical. In the first few years of the 2000s, ENR's top-five companies each had roughly a 20 percent share of the addressable market in any given year. But by the end of the first decade, their shares had steadily increased to more than 28 percent. (See Exhibit 9.) Beyond simply being better positioned to win megaprojects and capture economies of scale, the top five were able to hire the best talent and aggregate the deepest and broadest technical expertise. Each completed project contributed knowledge that could be applied toward improving execution on the next. Those companies were also able to deploy their substantial balance sheets either to absorb risk in a project or to provide equity financing. Their financial firepower played a large role in winning new contracts.

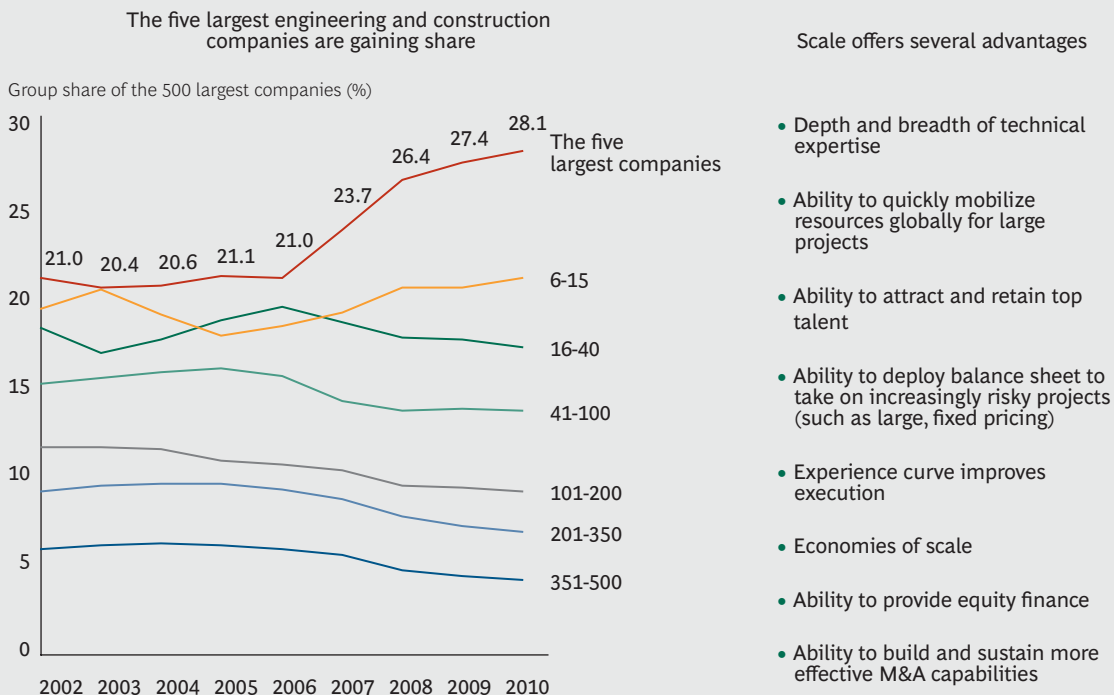
But scale is not the same thing as size itself. While scale greatly improves a company's

EXHIBIT 8 | Large Projects Are Getting Larger



Sources: McGraw-Hill Construction's Dodge data and Players database, 2005–2009; IHS Herold; BCG analysis.
 Note: The quartiles are defined each year by project size.

EXHIBIT 9 | The Largest Companies Continue to Gain Share



Source: *Engineering-News Record* Top 500 Design Firms Sourcebook, 2003–2011.
 Note: Based on total global noncontracting volume. The companies within each ranking may vary from year to year.

ability to compete for specific projects or for projects in particular sectors, size can create limitations as well as opportunities. Large companies can have trouble achieving double-digit growth, and in the search for incremental growth, they can end up in sectors or locations where they have insufficient scale or advantage to compete.

More than other industries, ECS relies on M&A to deliver shareholder returns.

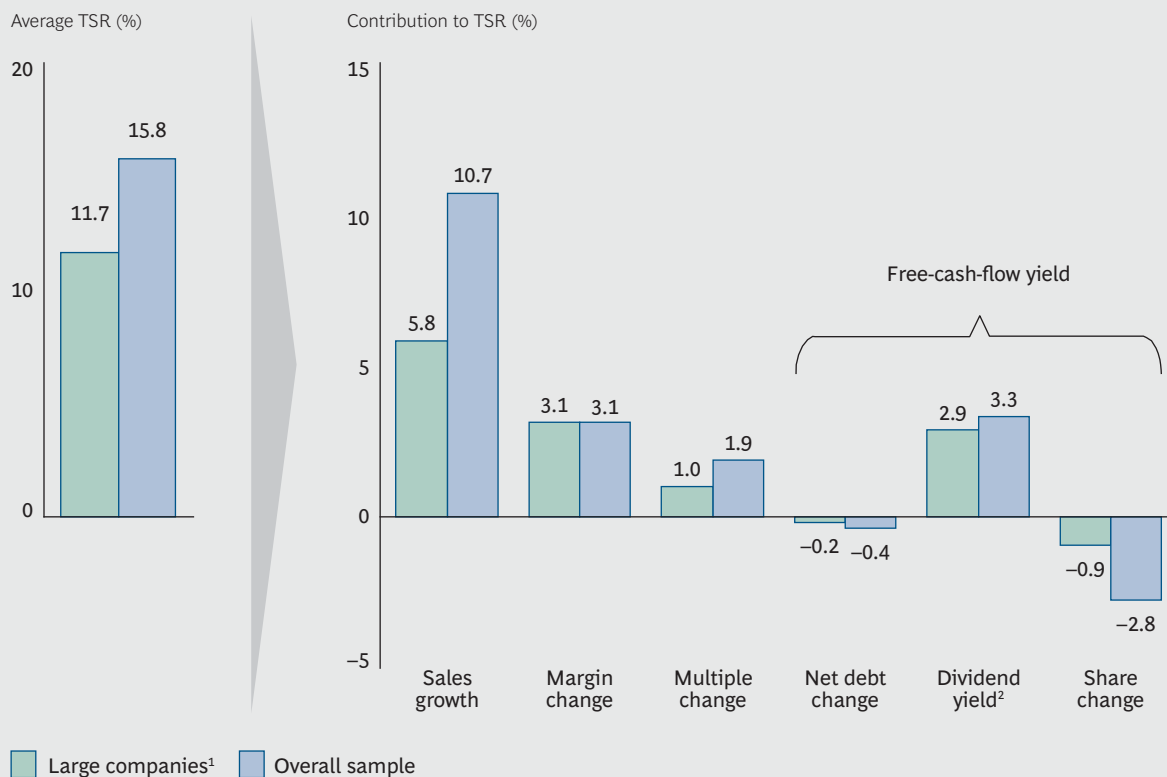
Analysis by BCG’s ValueScience Center of the drivers of valuation multiples in the ECS industry found that although a company’s size was statistically significant in explaining its valuation multiple, several other factors—including margins, capital discipline, and dividend payouts—all mattered just as

much, if not more. In fact, when we screened our sample purely for size, we found that companies with at least \$10 billion in 2002 revenues actually delivered an average TSR (11.7 percent) that was lower than the sample (15.8 percent) primarily because of lower revenue growth. (See Exhibit 10.) It is critical for ECS executives to remember that size confers substantial benefits—but that a broader set of value levers contributes to maximizing TSR.

THE UNIQUE IMPORTANCE OF M&A

More than other industries, ECS relies on M&A to deliver shareholder returns. That’s because, relative to other industries, ECS is highly fragmented, with many smaller, privately owned companies. (BCG analysis of M&A deals has demonstrated that, on average, smaller targets and private targets tend to drive more value for the acquirer.) Furthermore, generational exits seem to play a crucial role in triggering transactions. Also, ECS has a clear, powerful basis for revenue

EXHIBIT 10 | The Largest ECS Companies Delivered Subpar TSR



Sources: S&P Capital IQ; BCG ValueScience Center.

Note: All underlying values are based on U.S. dollars.

¹Companies with at least \$10 billion in revenues in 2002 (eight in our sample).

²Dividend contribution includes investment of dividends and special dividends, compounded monthly.

synergies that is shared by few other industries. Some mergers enable combined companies to sell services into new locations, while others add capabilities, project teams, or technologies that help companies win new types of contracts and take on new types of projects. Cross-selling synergies are often overestimated in M&A deals generally, but they form a sound foundation for deals in ECS.

Our analysis of ECS deals over the past ten years suggests that systematic serial acquirers deliver higher shareholder returns than companies that make fewer acquisitions. Companies that made four or fewer M&A deals over this period (which works out to no more than approximately one deal every two and a half years) had median ten-year returns of 12 percent with a low of -2 percent. On the other hand, companies that made more than 20 deals (more than two per year, on average) posted a median TSR of 25 percent and a low of 20 percent. (See Exhibit 11.)

Similarly, top-quartile companies altogether made roughly 158 deals over the past ten years—the same number of deals as the second and third quartiles combined. We also found that top-half companies tended to buy the smallest targets (measured by net assets) and focus the most on emerging-markets-based targets. (See Exhibit 12.) Their consistent outperformance further illustrates that gaining access to the right capabilities and locations is most important for creating value in ECS: it’s not simply a matter of buying and combining with another large company, where significant value would be created through cost take-out (for example, by streamlining duplicative functions and combining IT infrastructure).

To better understand the ongoing importance of M&A in ECS, consider the amount of “dry powder”—in terms of untapped borrowing capacity as well as excess free cash—that the top companies hold in reserve. In an industry with plenty of small, private enterprises val-

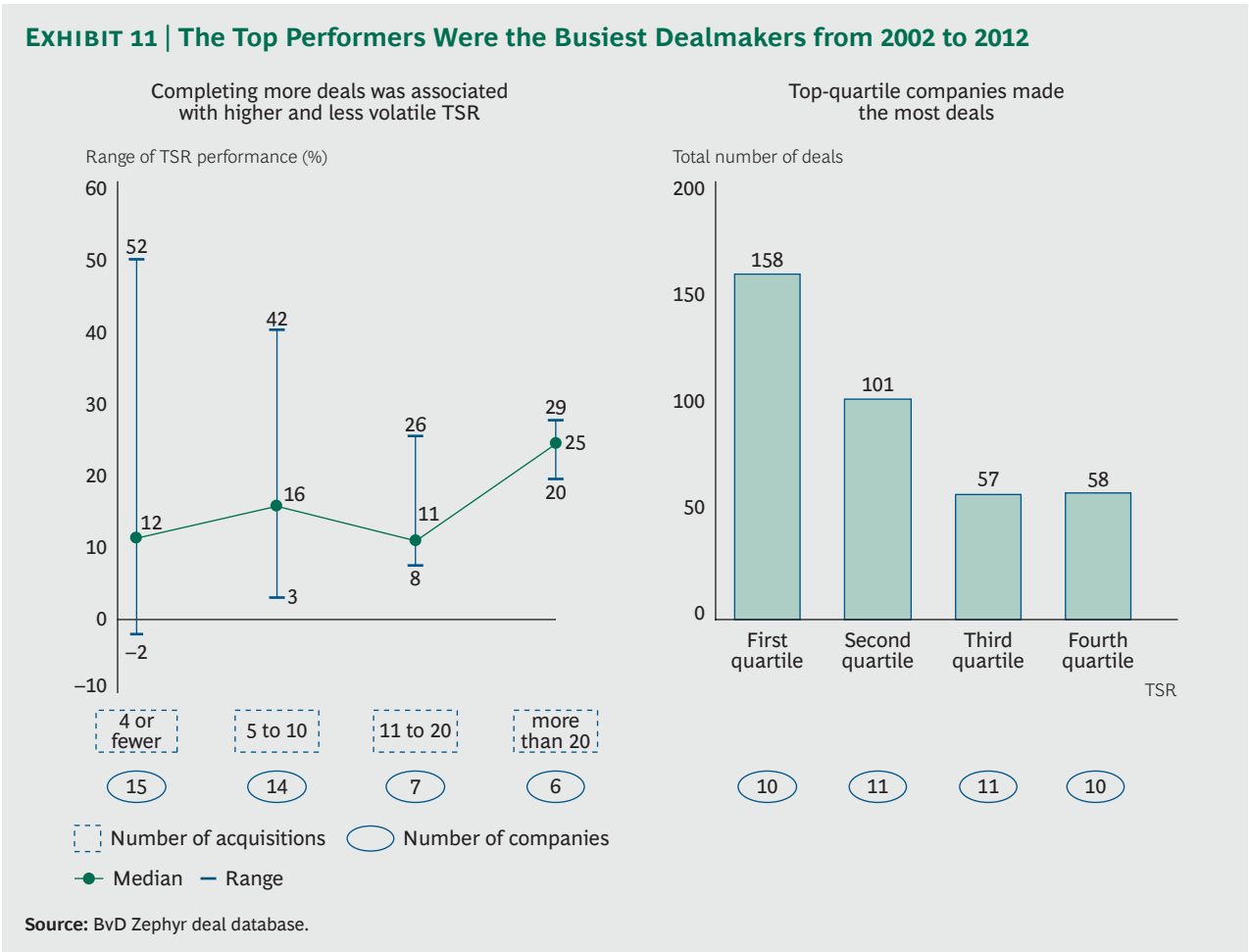
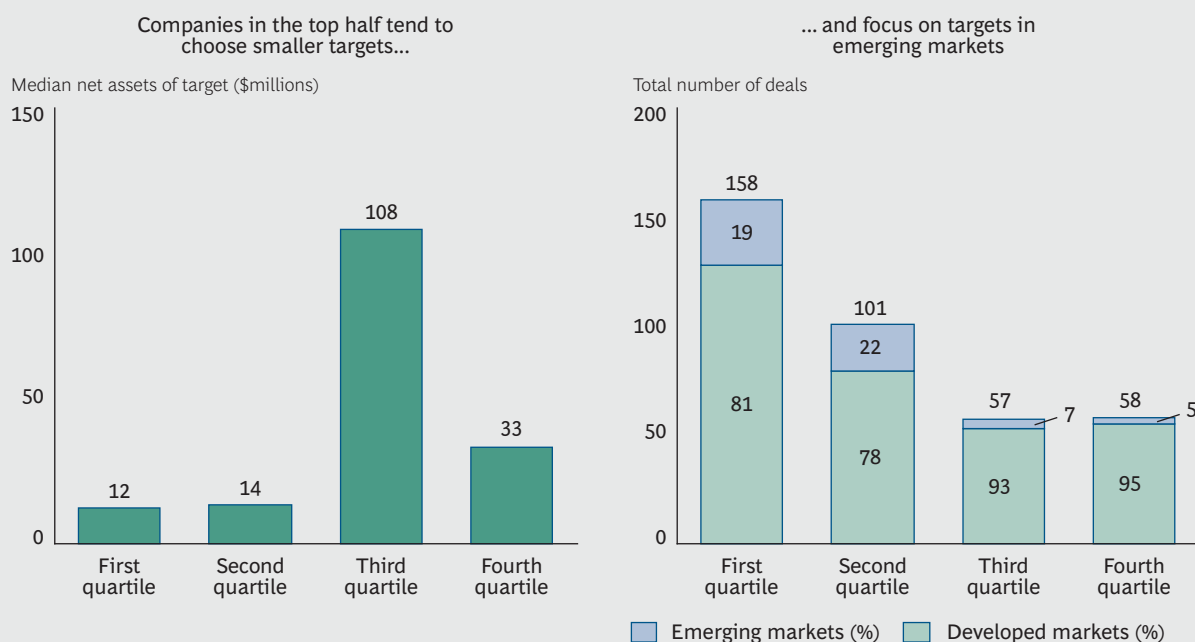


EXHIBIT 12 | The Top Companies Pick Their M&A Targets Carefully



Source: BvD Zephyr deal database.

Note: The analysis does not include deals for which the net assets of the target were not recorded.

ued in the hundreds of millions of dollars, we found that approximately 60 percent of companies could easily borrow \$1 billion and that some, including Reliance Industries, Vinci, and Technip, could access well in excess of \$4 billion, as needed. (See Exhibit 13.) Note, however, that these findings are actually somewhat conservative because top-quartile companies can draw on deeper pools of debt than lower-quartile firms and because target companies can bring additional debt capacity.

THE EMERGENCE OF NEW COMPETITIVE THREATS

We estimate that highly efficient Korean competitors have established a 25 to 30 percent cost advantage over their Western rivals, thanks to strategic procurement, lower labor costs (especially for engineers), standardized processes, strong project-management capabilities, and a willingness to take on significant project risk. (See the sidebar “The Growing Korean Advantage,” page 22.)

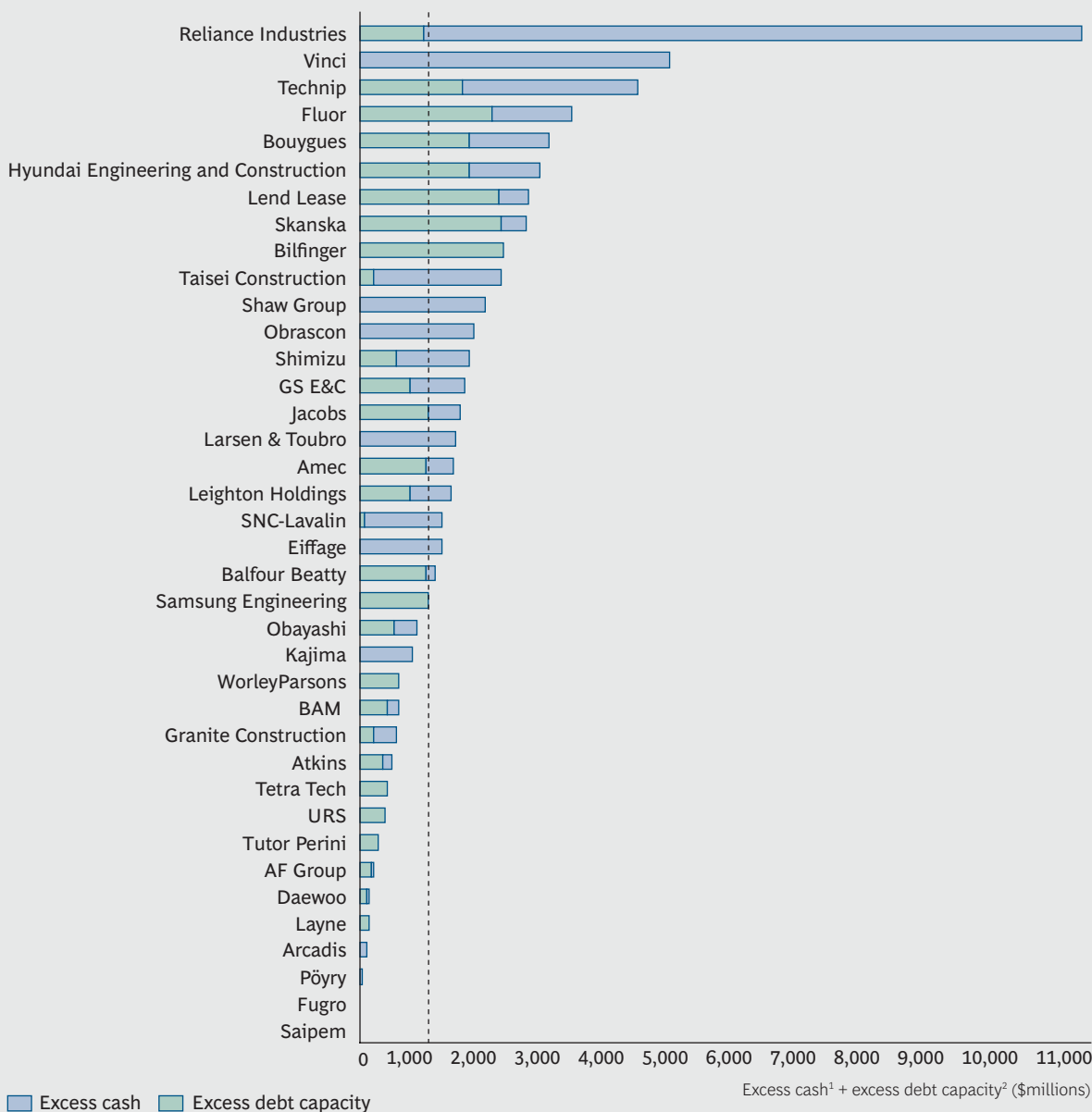
Chinese competitors, meanwhile, are starting to emerge as global players. For the moment, they remain focused on local markets and rapidly developing economies (RDEs), but the Chinese government is providing these home-

grown companies with essentially free capital, which has encouraged them to sacrifice profits in the short term as they establish a foothold in the international market.

It is clear from the data that Korean and Chinese companies are steadily emerging as ECS powerhouses. Though Korean companies have been among the top value creators over the past ten years, Chinese companies now represent seven of the 20 largest global ECS organizations (as measured by revenues). And although they haven’t been publicly listed for long—and most of their brief histories of TSR have been affected by the recession—Chinese companies could deliver substantial value to investors in the future. As they gain expertise in standardization, for example, they will likely compete for more and larger projects.

Asian companies are not the only ones that have affected and continue to threaten the ECS establishment. In the wake of the financial crisis, large Spanish companies that had aggressively pursued greenfield infrastructure markets in southern Europe have begun looking toward relatively healthier markets in the U.S. and Canada. They have gone after con-

EXHIBIT 13 | The ECS Industry Has Dry Powder for Deal Making



Sources: S&P Capital IQ; BCG ValueScience Center.

¹Excess cash is defined as cash above and beyond 5% of revenues.

²Excess debt capacity is defined as the difference between 30% of assets and debt.

cessions and infrastructure projects and proven willing to compete aggressively—in many cases, bidding extremely low to win projects.

These types of competitive moves suggest that the era of cost competition is here to stay. We believe that companies with low cost structures and disciplined pricing and procurement processes will be able to maintain their positions in this environment and that those with specialized and differentiated skill sets will be best positioned to maintain their

pricing power and continue to expand profitability.

THE INTERNATIONALIZATION OF WINNERS

It is striking that every top-quartile company in our TSR analysis is based outside the United States. In many cases, leading organizations, such as Larsen & Toubro, have prospered thanks to their proximity to markets where demand for ECS is growing strongly. In other cases, companies have built up dominant positions (not to mention high-caliber talent and

THE GROWING KOREAN ADVANTAGE

The financial crisis didn't slow the advance of ECS companies in Korea—quite the opposite, in fact. We found that the value of overseas contracts for Korean companies grew 25 percent annually from 2002 to 2006, and then accelerated to 30 percent annually from 2006 to 2010. This rapid growth enabled Korean companies to increase their share of the global process market from about 4 percent in 2005 to approximately twice as much in 2010.

Korean companies have driven these gains by producing exceptional work with a significant cost advantage—approximately 25 to 30 percent. Procurement has been the biggest driver of the cost advantage; by putting their procurement teams in low-cost countries, Korean companies have tapped into lower labor costs and gained access to local suppliers and prices.

Labor and processes also have contributed to both project results and bottom-line performance. Korean companies' labor advantages involve productive, diligent, and skilled engineers as well as low-cost labor pools in developing countries, such as India, that they tap into for lower-value tasks. For actual construction work, they

make direct hires in the project region. In terms of process, Korean companies have shown that they have, in many cases, superior project-management capabilities, leaner decision-making structures, and fewer process requirements relative to competitors in the developed world.

Finally, Korean companies have been able to prefabricate and modularize certain aspects of their construction projects, and accept more project risk, as they have gained more confidence in their ability to execute on time and within budget.

The Korean advantage does not extend into every dimension of the ECS business. Korean companies have met with only limited success in penetrating the “frontier” areas of the business—projects focused on mineral extraction, such as oil and gas discovery and mining. These projects tend to be sited in some of the world's most remote and forbidding regions and consequently are characterized by enormous technical complexity that demands rapid innovation. In this respect, at least, Korean companies still have some ground to make up.

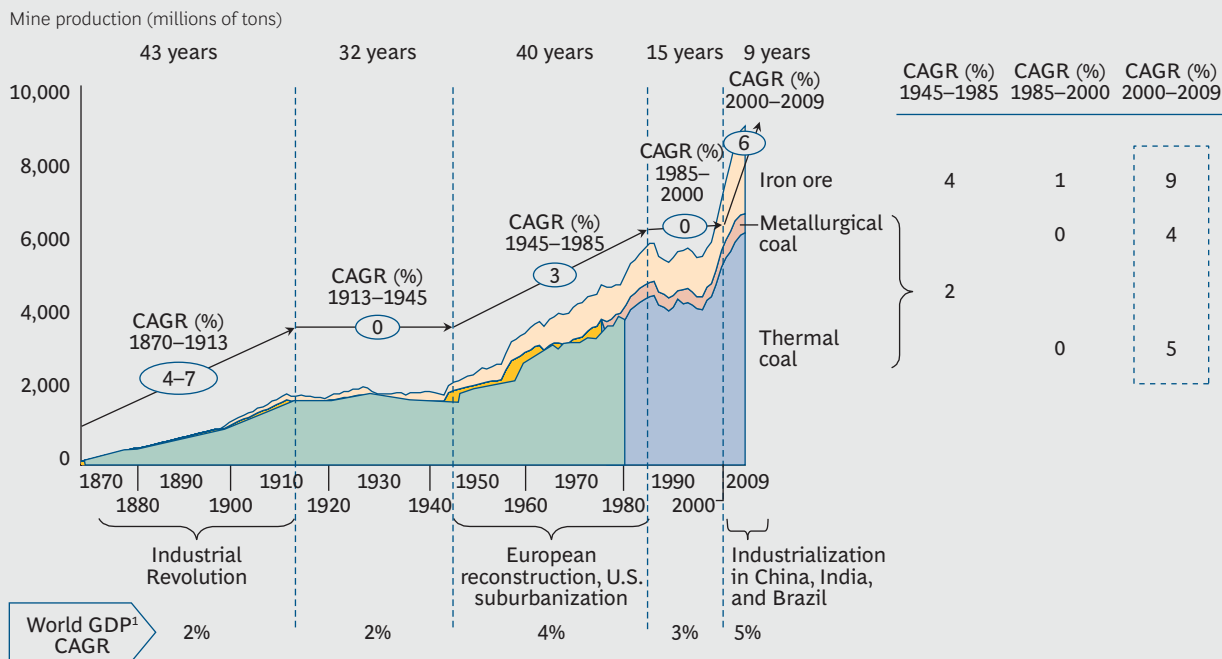
strong balance sheets) in their home markets—*domestic fortresses*, in our terminology—which they have then parlayed into success in emerging regions. The Australian company Leighton Holdings, for example, uses a holding-company structure to facilitate bids by multiple acquired subsidiaries. This not only raises the odds of a Leighton win and preserves market share, but it also reduces competitive intensity and allows for balancing risk across operating companies. Interestingly, though, domestic fortresses have proven somewhat susceptible to takeover. Leighton was acquired by Hochtief (another domestic fortress) in 2000, and then Hochtief in turn was acquired by ACS (yet another domestic fortress) in 2011.

The importance of access to high-growth regions cannot be overstated. Throughout

history, large-scale developments—such as the Industrial Revolution, the reconstruction of Europe following World War II, and the suburbanization of the United States—have powered “supercycles” of economic growth. (See Exhibit 14.) We believe that the world is in the midst of yet another supercycle, driven by the industrialization of RDEs in China, India, and Brazil. Industrialization at such a pace and on such a massive scale requires the extraction of vast amounts of minerals, including coal and iron, to support the build-out.

This extraction, in turn, supports both direct ECS work—building mines, for example—and indirect work, such as the construction of roads and railways to and from the mines, as well as broader infrastructure to support the

EXHIBIT 14 | Commodity “Supercycles” Drive Macroeconomic Growth



Sources: U.S. Energy Information Administration; BP Statistical Review of World Energy; Richard L. Gordon, *World Coal: Economics, Policies, and Prospects*, (Cambridge University Press, 1987); USGS Minerals Yearbook 2009; BCG analysis.

Note: EIA metallurgical coal data available from 1980: 1900–1980 are total coal, with 1900–1965 using hard coal production as proxy for total coal; 2009 data for iron ore are U.S. Geological Survey estimates.

¹Measured in 1990 Geary-Khamis dollars.

burgeoning middle class. We believe that this dynamic is at least partly responsible for the dominance of RDEs in driving global construction growth. We have found, for example, that the growth outlook for RDEs is higher than that of developed economies in every single construction sector. (See Exhibit 15.) This underscores the fact that while an RDE strategy isn’t a sure-fire path to superior value creation, it certainly must play a role in any company that hopes to continue to grow aggressively.

An RDE strategy must play a role in any company that hopes to grow aggressively.

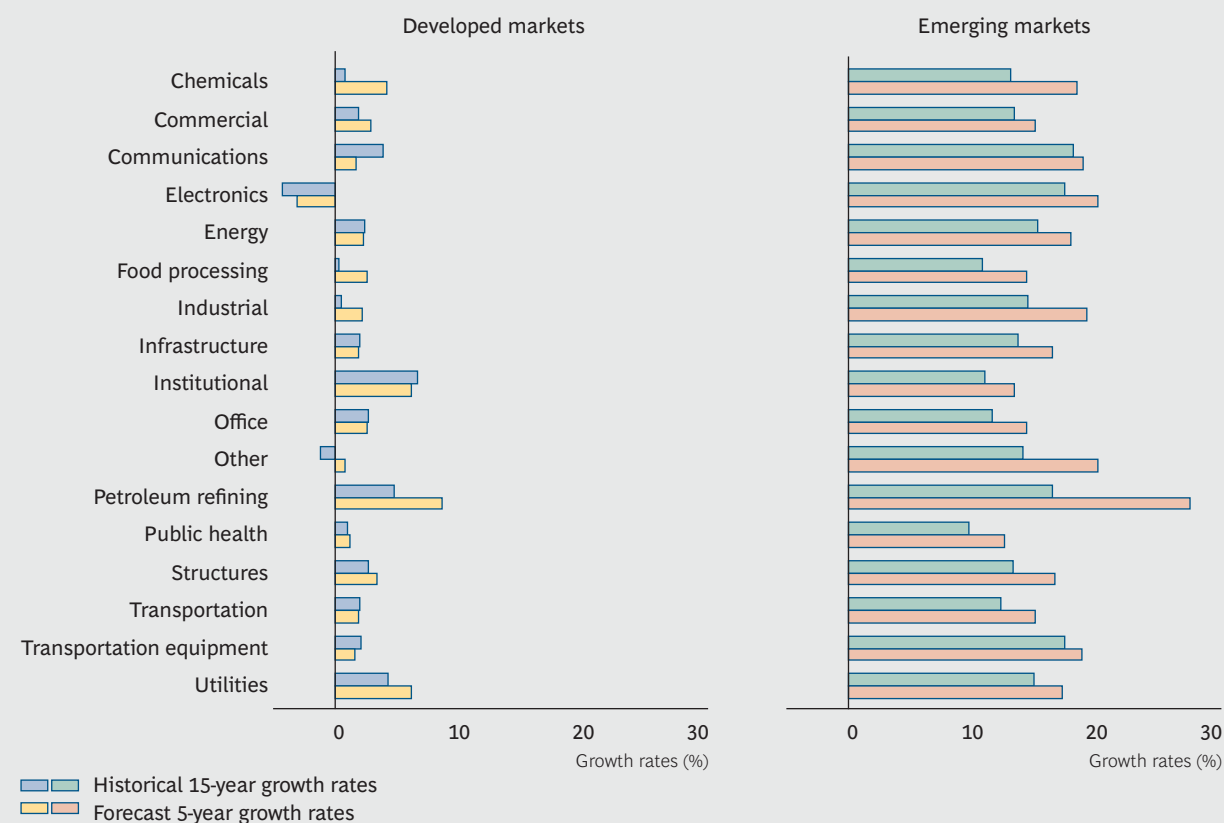
Our overall sample delivered about 6 percent more annual TSR than the U.S.-based companies in our sample (15.8 percent versus 9.6 percent). (See Exhibit 16.) Interestingly, while

the two groups don’t differ very much in sales growth (10.7 percent versus 9.6 percent), there are meaningful differences in profit margin expansion (3.1 percent versus 0.8 percent) and very significant differences in FCF yield, mostly driven by the lower dividends that U.S.-based companies pay (3.3 percent yield versus 0.4 percent yield). This comparison underscores the importance of not just growth to shareholder returns, but also of managing costs and maintaining capital discipline.

MOUNTING VOLATILITY RISK

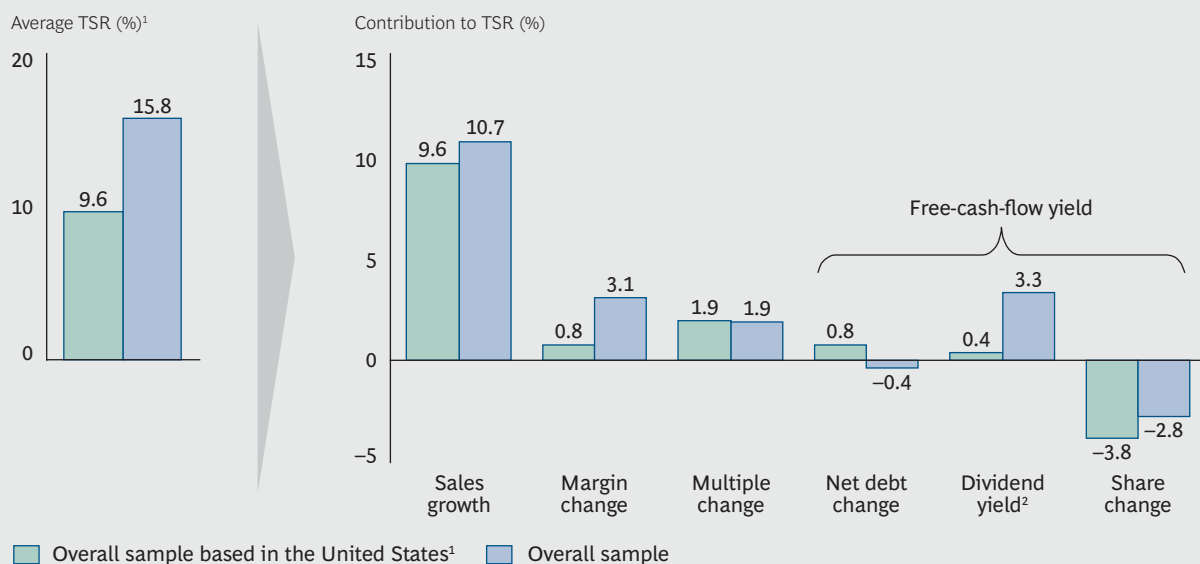
Mineral extraction is a double-edged sword: just as it powers ECS growth when commodity prices are rising, it can undermine growth when commodity prices reverse course. It is no coincidence that as ECS companies’ exposure to commodity prices has increased, so have their bankruptcy filings and forced sales. This trend highlights the need for ECS companies to carefully weigh pricing and risk-management considerations when bidding for contracts. Failure to do so puts those companies

EXHIBIT 15 | Location Drives Market Growth More Than Sector Does



Source: IHS Global Insight.

EXHIBIT 16 | Companies Based in the U.S. Underperformed



Sources: S&P Capital IQ; BCG ValueScience Center.

Note: All underlying values are based on U.S. dollars.

¹Companies that conduct more than 50 percent of their business in the U.S. (seven companies in our sample) were defined as based in the U.S.

²Dividend contribution includes investment of dividends and special dividends, compounded monthly.

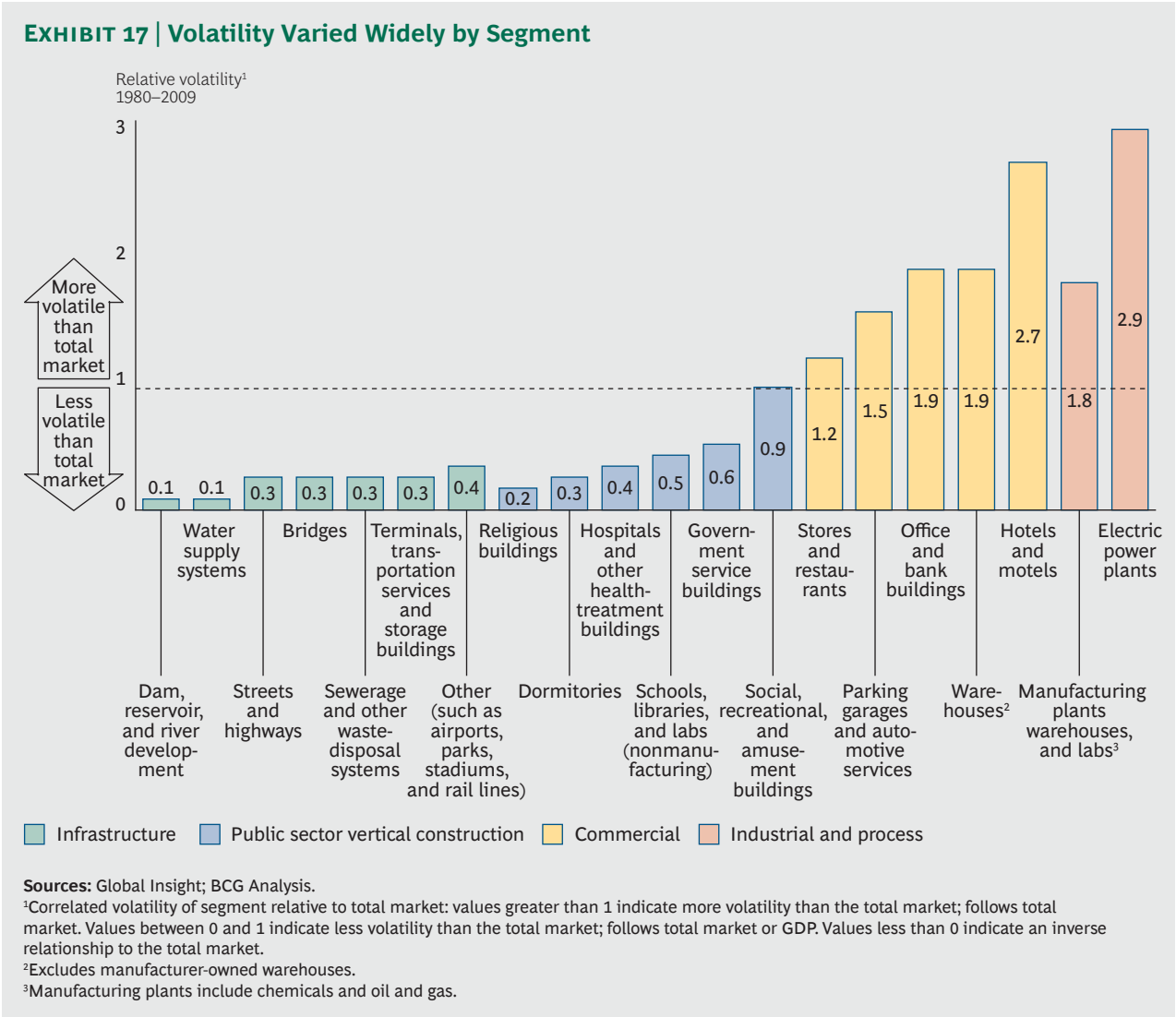
at risk of underbidding to win contracts, only to find themselves on the hook for massive cost overruns when the economic winds shift.

Sector choices play a key role in exposure to volatility. Our analysis over a 30-year period (1980 through 2009) showed that infrastructure expenditures demonstrate by far the least volatility, typically just a fraction (one-tenth to four-tenths) of the overall market. (See Exhibit 17.) Public-sector vertical construction also was quite steady. In contrast, commercial expenditures were significantly more volatile than the market (1.2 times to 2.7 times more) and industrial and process sectors proved the most volatile (1.8 times to 2.9 times more).

Developing disciplined business processes (such as procurement, pricing, and project ex-

ecution) also can help reduce exposure to volatility by managing project-based risk—the risk of underbidding on a fixed-price contract and being exposed to massive cost overruns. Size and diversification also help. Larger companies that do business across a range of industrial sectors and regions can ride out the occasional bad contract or slump in a particular sector, whereas organizations that are concentrated in a particular region or sector face a greater risk.

Mere diversification isn’t enough, however—in fact, companies can face even more risk when they diversify into new spaces where they lack the scale to compete or are insufficiently prepared to correctly price jobs, manage business processes, or effectively execute the work. ECS companies need to make sure that they have a strong awareness



of their core capabilities as they diversify. In M&A scenarios that include acquiring capabilities, companies must have the right deal structure to retain and leverage the talent that is acquired. For example, using equity as currency or creating earn-outs for key employees after a merger can help ensure that top talent won't take the money and run.

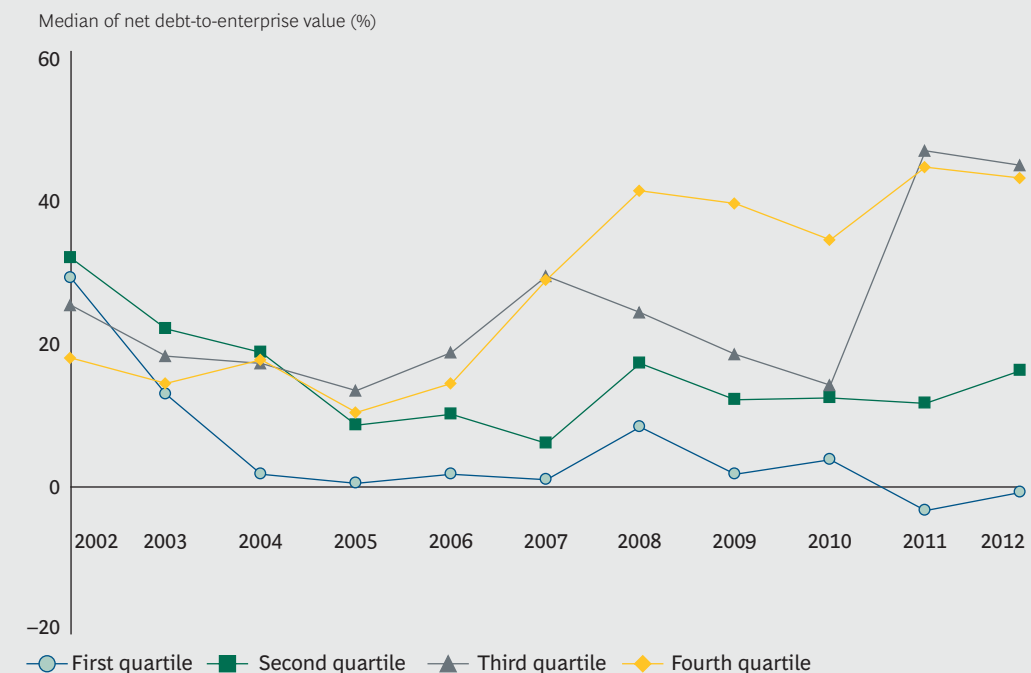
The Capital Discipline Advantage

To be clear, growth matters—and it matters a lot. But it is not *all* that matters. Shareholders ultimately judge stocks on the basis of the cash flows that are returned, whether today or tomorrow, to their pockets. Dollars reinvested in the business must deliver returns above the cost of capital. Companies can grow by expanding debt or diluting existing shareholder equity through issuance of additional shares, but either action changes the future cash-yield profile of a company. Adding debt also changes a company's risk profile—a significant concern in an industry as volatile as ECS.

Our analysis suggests a few important findings related to capital discipline:

- *Top performers manage asset intensity well.* Because capital tied up in the business cannot be paid out to shareholders, and because some business models, such as infrastructure construction and concessions, demand significant capital commitments, shareholders pay intense attention to the capital requirements of ECS companies and scrutinize their skills at maximizing dollars of sales per dollar of capital invested. We found this consideration to be a critical, though often overlooked, driver of ECS valuation multiples.
- *Debt giveth, and debt taketh away.* Accessing debt markets is always tempting for a company trying to grow—and particularly now, when rates remain at historical lows. And as a general rule, we encourage ECS companies to use debt as a source of funds to grow their businesses. That said, we found that the lowest-performing ECS companies were also the most highly leveraged. (See Exhibit 18.) Moreover, the ECS landscape is littered with companies that experienced financial reversals and were forced into a distressed sale or even bankruptcy. We further found debt levels

EXHIBIT 18 | High Leverage Correlates with Low TSR Performance



Source: S&P Capital IQ.

to be statistically significant in the valuation multiple of a company.

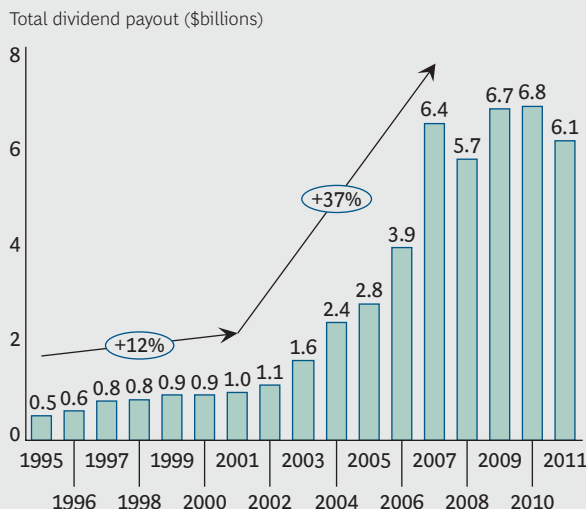
- Dividends are compatible with growth.** Many growth companies (for example, many major technology companies) eschew dividends, believing that regular quarterly payments of cash to investors represent an abandonment of growth opportunities. But BCG's research suggests that dividends not only provide a direct boost to shareholder returns but also can lift a company's valuation multiple. Dividend payout ratios (as a percentage of earnings before interest, taxes, depreciation, and amortization) are significant for the valuation multiples of ECS companies. Most interesting, while we found that our ECS sample in aggregate greatly increased dividend payouts (particularly in the first few years of the 2000s), top-quartile

performers continued to raise dividends during the downturn—whereas lower performers all reined in dividends. (See Exhibit 19.) This is a key point. Just as investors put a higher valuation on companies that initiate or increase dividends because the move signifies management's confidence in future profit growth, they will punish companies that cut dividends because of the alarming signal that action sends about anticipated future performance.

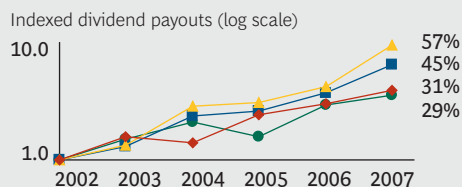
Ultimately, these findings reinforce the importance of ECS companies seeking growth not for its own sake but as a means of delivering superior shareholder returns—by thoughtfully trading off sources and uses of capital on a case-by-case basis, depending, for example, on business opportunities, market conditions, and investor preferences.

EXHIBIT 19 | Top Performers Increased Dividends During the Downturn

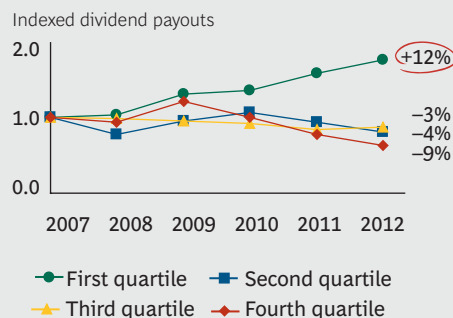
Dividends have become more common in the ECS industry



While companies at all levels grew dividends quickly in the first few years of the 2000s....



...Only top-quartile companies continued to grow dividends during the downturn



Sources: S&P Capital IQ; BCG analysis.

EMERGING THEMES AND RECOMMENDATIONS

OUR ANALYSIS HOLDS SEVERAL lessons for ECS executives as they survey the market landscape and evaluate their own companies' value-creation potential.

The Lessons in the Numbers

ECS executives who apply these lessons to their own companies can position them to compete and succeed in a dynamic marketplace bristling with new challenges and competition.

- *Get to scale, both at the company level and on a sector-by-sector basis.* Develop a clear understanding of the paths available to achieve scale, whether they involve M&A or self-generated revenue enhancements, and streamline and refocus fragmented business portfolios to make the necessary, more highly concentrated bets.
- *Build world-class M&A capabilities.* Given the outsize role that M&A plays in creating value for ECS companies, companies must develop exceptional M&A capabilities. M&A enables companies to seize value-creating opportunities not just to achieve scale but also to acquire strategically advantageous capabilities and technologies, obtain sought-after talent and knowledge, gain access to high-growth markets and key projects, and realize revenue synergies. Remember that each transaction teaches new lessons that can then be applied in any succeeding transactions.
- *Maintain capital discipline and return cash to shareholders.* As important as it is to invest for growth and profits, rigorously evaluating investment returns and ruthlessly jettisoning businesses with substandard or negative returns are equally important. And when conditions allow, be ready to increase quarterly dividends or launch share repurchases to supplement TSR.
- *Become competitive on cost with global emerging threats.* By developing world-class process standardization and controlling labor costs, Korean ECS companies have established a significant cost advantage over their Western rivals. Spanish companies, meanwhile, are aggressively moving into new foreign markets following the challenges they have seen closer to home. And companies of all types are competing harder than ever for construction projects. To ensure long-term viability, Western companies must become more disciplined in their bidding and pricing processes, improve procurement, tap into outsourcing (including for engineers) where appropriate, invest in technology, and improve project-execution processes.

- *Focus on differentiation and innovation.* ECS companies do not compete on cost alone. Companies that develop unique, highly sought-after capabilities, as well as innovative processes and technologies that simply can't be duplicated elsewhere at any price, can maintain pricing power and profitability in the face of emerging competitive threats.
- To help ECS executives implement these lessons and assess the effectiveness of their value-creation plans, we have compiled a set of 15 questions to consider. (See the sidebar “Value-Creation Questions for ECS Executives.”) Answering those queries in light of their companies’ business model, skill sets, competitive position, and geographic orientation will help ECS leaders

VALUE-CREATION QUESTIONS FOR ECS EXECUTIVES

ECS executives looking to assess the effectiveness of their value-creation plans should ask themselves the following questions.

1. Do I have a value-creation strategy that encompasses growth, margins, business model choices, and the sources and uses of capital?
2. What is the projected TSR contribution for each division in my company? Are any divisions expected to under-deliver, or perhaps even destroy, value?
3. Are our planned investments aligned with our strategy?
4. What is the optimal shape of our portfolio? Where should we focus our business, and where should we look to diversify?
5. How exposed are we to the mineral-extraction “supercycle”? How can we leverage global-growth tailwinds?
6. What global footprint do we need? Which new markets should we target? How should we enter?
7. How exposed are we to volatility and risk? Are we pricing projects appropriately? What would be the effect of funding cutbacks in key sectors?
8. What scale is required to win? How can we take advantage of our scale?
9. What is the right mix of M&A and internally generated growth? What are our top strategic initiatives, and where does each one stand?
10. Do we have the right M&A organization, capabilities, and plan? Do we understand how we can add value differentially to acquisitions?
11. How is our competitive set changing? Which two or three companies might be our top competitors in five years? In ten? What will we need to do to win against them?
12. What is our cost position relative to the leaders on this dimension? What are our relative labor costs? What are our relative procurement costs? Can we be more efficient?
13. What organization capabilities are needed—both at the corporate center and in the business units?
14. Have we optimized our capital structure and cash position?
15. Do we have the right dividend policies? What is our target payout and over what period will it be delivered?

determine the right mix of value-creating activities.

Seizing Control of the Cycle

ECS companies are emerging from a period of unprecedented volatility, and the new competitive landscape is filled with both threats and opportunities never before seen on such a scale. The companies that will win

in this challenging new world will combine financial strength with operational flexibility, scale with specialization, and a keen awareness of risk with an eagerness to take on new kinds of projects in far-flung markets. Well-managed companies with the right capabilities, sound financial foundations, and strong M&A operations can take control of—rather than submit to—the industry’s explosive cycles.

FOR FURTHER READING

The Boston Consulting Group publishes many reports and articles that may be of interest to ECS management teams. Recent examples include the publications listed here.

Enabling PMI: Building Capabilities for Effective Integration

A Focus by The Boston Consulting Group, July 2012

How Value Patterns Work

BCG Perspectives, June 2012

Value Patterns: The Concept

BCG Perspectives, May 2012

The CEO as Investor

BCG Perspectives, March 2012

First, Do No Harm: How to Be a Good Corporate Parent

A report by The Boston Consulting Group, March 2012

The Power of Diversified Companies During Crises

A report by The Boston Consulting Group and HHL–Leipzig Graduate School of Management, January 2012

M&A: Using Uncertainty to Your Advantage

A Focus by The Boston Consulting Group and UBS Investment Bank, December 2011

No Time Like the Present to Plan an IPO

A report by The Boston Consulting Group, October 2011

Risky Business: Value Creation in a Volatile Economy

The 2011 Value Creators Report, September 2011

Riding the Next Wave in M&A: Where Are the Opportunities to Create Value?

A report by The Boston Consulting Group, June 2011

The Art of Planning

A Focus by The Boston Consulting Group, April 2011

Does Practice Make Perfect? How the Top Serial Acquirers Create Value

A Focus by The Boston Consulting Group and HHL–Leipzig Graduate School of Management, April 2011

Best of Times or Worst of Times?

A report by The Boston Consulting Group and the Royal Bank of Scotland, February 2011

Threading the Needle: Value Creation in a Low-Growth Economy

The 2010 Value Creators Report, September 2010

Accelerating Out of the Great Recession: Seize the Opportunities in M&A

A report by The Boston Consulting Group, June 2010

Cross-Border PMI: Understanding and Overcoming the Challenges

A Focus by The Boston Consulting Group, May 2010

Megatrends: Tailwinds for Growth in a Low-Growth Environment

A Focus by The Boston Consulting Group, May 2010

After the Storm

The 2010 Creating Value in Banking Report, February 2010

Time to Engage—or Fade Away: What All Owners Should Learn from the Shakeout in Private Equity

BCG White Paper, published with the IESE Business School of the University of Navarra, February 2010

NOTE TO THE READER

About the Authors

Jeff Hill is a partner and managing director in the Los Angeles office of The Boston Consulting Group and the global leader of the engineering, construction, and services sector.

Danny Friedman is a senior partner and managing director in the firm's Los Angeles office and the leader of the Corporate Development practice in the Americas. **Jody Foldesy** is a principal in BCG's Los Angeles office.

Acknowledgments

The authors would like to acknowledge the contributions of Gerry Hansell, Decker Walker, Andrew Loh, Mikko Fischer, Edward Vaisberg, and Ed Blunderfield. They would also like to acknowledge the contributions of Joseph Brilando and David Taube of BCG's ValueScience Center. In addition, the authors would like to thank Mary Leonard for her coordination leadership and Harris Collingwood for his assistance in writing this report. Finally, they wish to thank Katherine Andrews, Gary Callahan, Angela DiBattista, Lilith Fondulas, and Sara Strassenreiter for their contributions to the editing, design, and production of the report.

For Further Contact

This report was sponsored by BCG's Industrial Goods practice and cosponsored by the Corporate Development practice. BCG works with its clients to deliver solutions to the challenges discussed in this report. These clients include some of the world's largest and most successful ECS companies. If you would like to discuss the insights in this report or learn more about the firm's capabilities in the ECS industry, please contact the authors or your local BCG team.

Jeff Hill

Partner and Managing Director
BCG Los Angeles
+1 213 621 2772
hill.jeff@bcg.com

Danny Friedman

Senior Partner and Managing Director
BCG Los Angeles
+1 213 621 2772
friedman.daniel@bcg.com

Jody Foldesy

Principal
BCG Los Angeles
+1 213 621 2772
foldesy.jody@bcg.com

© The Boston Consulting Group, Inc. 2013. All rights reserved.

For information or permission to reprint, please contact BCG at:

E-mail: bcg-info@bcg.com

Fax: +1 617 850 3901, attention BCG/Permissions

Mail: BCG/Permissions

The Boston Consulting Group, Inc.

One Beacon Street

Boston, MA 02108

USA

To find the latest BCG content and register to receive e-alerts on this topic or others, please visit bcgperspectives.com.

Follow [bcg.perspectives](https://www.facebook.com/bcg.perspectives) on Facebook and Twitter.



BCG

THE BOSTON CONSULTING GROUP

Abu Dhabi
Amsterdam
Athens
Atlanta
Auckland
Bangkok
Barcelona
Beijing
Berlin
Bogotá
Boston
Brussels
Budapest
Buenos Aires
Canberra
Casablanca

Chennai
Chicago
Cologne
Copenhagen
Dallas
Detroit
Dubai
Düsseldorf
Frankfurt
Geneva
Hamburg
Helsinki
Hong Kong
Houston
Istanbul
Jakarta

Johannesburg
Kiev
Kuala Lumpur
Lisbon
London
Los Angeles
Madrid
Melbourne
Mexico City
Miami
Milan
Minneapolis
Monterrey
Montréal
Moscow
Mumbai

Munich
Nagoya
New Delhi
New Jersey
New York
Oslo
Paris
Perth
Philadelphia
Prague
Rio de Janeiro
Rome
San Francisco
Santiago
São Paulo
Seattle

Seoul
Shanghai
Singapore
Stockholm
Stuttgart
Sydney
Taipei
Tel Aviv
Tokyo
Toronto
Vienna
Warsaw
Washington
Zurich