FMI/CMAA Tenth Annual Survey of Owners

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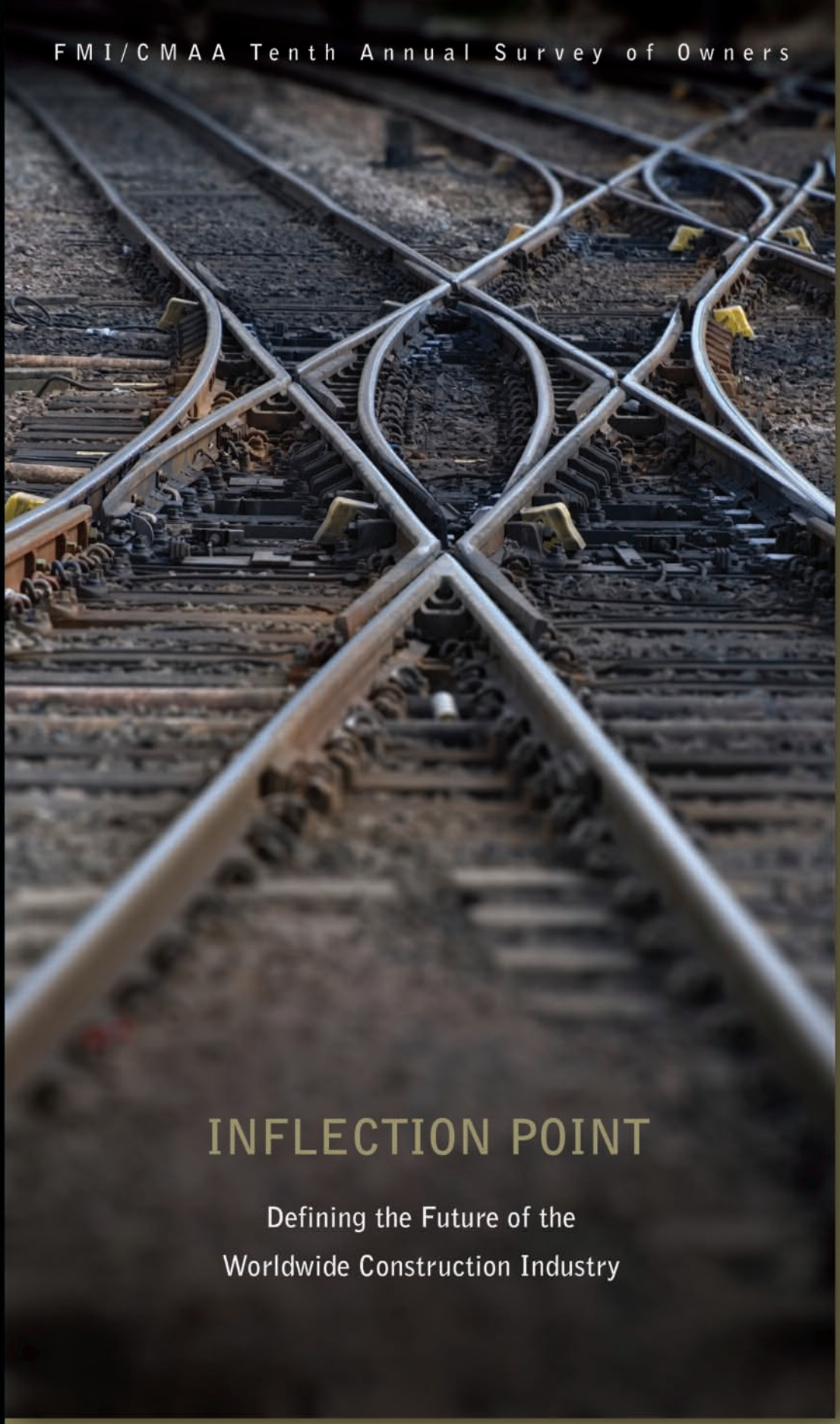

INFLECTION POINT

Defining the Future of the Worldwide Construction Industry

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Acknowledgements

This *Tenth Annual Survey of Owners* is possible only through the leadership provided by Construction Management Association of America (CMAA). In addition, special thanks go to the owner members of CMAA, Construction Users Roundtable (CURT), Council of Educational Facility Planners International (CEFPI), Construction Owners Association of America (COAA), International Society of Pharmaceutical Engineers (ISPE), Western Council of Construction Consumers (WCCC), Construction Industry Institute (CII), North Central Electric Association (NCEA), Society of American Military Engineers (SAME), National Association of Industrial and Office Properties (NAIOP), and Health Facility Institute (HFI). Consulting, technology and other service providers to the AEC industry including AutoDesk, Contax LLC, e-Builder and Meridian Systems, supported the distribution of the survey request to their customers. Several friends of FMI assisted in international or market segment specific distribution. These friends include Dr. Dongping Fang and Dr. Jiayi Pan both from Tsinghua University in Beijing, David Bentley, Dr. Paul Giammalvo, Bart Grasso, Glyn Hazelden, Peter Hessler, and Angus Warren. Last, FMI and CMAA would like to thank Mimi Wheeler, an intern from North Carolina State University for her input and analysis.

EXECUTIVE SUMMARY

2009 marks the tenth time that FMI and the Construction Management Association of America (CMAA) have collaborated on a survey of construction owners. These surveys have addressed such current topics as accelerating use of program management, implementation of Building Information Modeling (BIM), and more effective risk management strategies. Individually, the surveys present snapshots of practices and attitudes in the owner community at given points in time. Collectively, they offer an opportunity to follow changes in these attitudes and practices and gain early insight into subjects that are becoming more or less important to owners over time.

The 2009 survey expressly takes this approach and was designed to assess how owner practices have changed in recent years. During 2008 and 2009, the economic and financial turmoil has resulted in a dramatic shift in the business environment for the A/E/C industry. This shift or "inflection point" represents a moment of dramatic change. In the A/E/C industry, typically it is five to ten years before we can look back and recognize the curvature shift. The *Tenth Annual Survey of Owners* examines the long-term trends affecting capital construction program management and focuses on how the construction delivery process, owner perspectives and necessary skill sets will transform the A/E/C industry over the next 10-20 years.

Four areas identified from the study demonstrated the greatest inflection:

- **Outsourcing Acceleration**
  - Sixty percent increase in Program Activation outsourcing since 2006
  - Thirty percent increase in Operations and Maintenance (O&M) outsourcing since 2006
  - Across the board increase in outsourcing of all other phases between 2009 to 2014

- **Perspectives/Experiences Shift Importance**
  - Increasing importance of maintenance support
  - Proactive claims avoidance expected
  - Increasing importance of aligning project delivery system selection to project characteristics and conditions
  - Proactive and early project leadership desired

- **Holistic Strategy Driving Life Cycle Cost or Asset Management Approach to Capital Construction**
  - Five of eleven areas most frequently mentioned for improvement by owners relate to or infer the use of a life-cycle-cost type approach

- **Dominant Forces Shaping A/E/C Industry**
  - Globalization
  - Social norms, mores, and expectations
  - Technology application and innovation
  - Economic performance
  - Political stability
  - Environmental influence

In the following pages are commentary and research results that document the feedback received. Owners and their various service providers can use this information as they struggle with the development of robust strategies to ensure their firms thrive over the coming generation.

HIGHLIGHTS

- Use of outsourcing in all project phases has either increased between 2006 to 2009 or will increase between 2009 and 2014
  - Program activation/commissioning and O&M demonstrate a 60 percent and 30 percent acceleration in outsource use, respectively

- Owners are taking a more holistic view of their capital construction efforts and expect a broader set of services from pre-design to O&M functions

- Between 2009 and 2014 owners attach significantly more importance to the following areas:
  - Selecting the most effective project delivery system
  - Maintenance management support in both process and technologies
  - Proactive strategies to avoid claims and disputes
  - Development and use of a construction management plan
  - Effective documentation and processes designed to support facility commissioning or turnover

- Eighteen percent of owners cited team coordination achieved by applying technology enhanced processes as the area needing greatest improvement
  - Architects and general contractors are percieved as providing less coordination, while program managers and construction management service providers are perceived as performing better in this regard

[Highest value support] "Be proactive and make recommendations; don't simply identify problems and areas of risk."

— Large Institutional Education Owners

- Internal communication among owner staff and effective cost control and management efforts from their senior managers are areas needing improvement for many owners

- Knowledge transfer, experience building through training, recruitment, and aging workforce solutions are top opportunities for represented labor leaders to meet owners' expectations

- Different types and sizes of owners maintain different expectations and priorities
  - Today, private/closely held organizations want a full range of services and more support, particularly in the pre-design or design phases and post-construction phases
  - Today and in the future, state agencies expect to perform the front-end activities in house
  - Today and in the future, publically traded owners do not want tactical help, particularly in monitoring cost, addressing compliance, defining scope of work, and work conformance testing
  - In the future, federal agencies are anticipating the need for more help with upfront pre-design or design services and construction oversight
  - In the future, municipal agencies anticipate needing help with claims support and compliance monitoring activities
  - Large owners with programs greater than $500 million do not want tactical help, particularly in building budgets, defining scope of work, commissioning, finding likely claims and building schedules
  - Small owners, with programs less than $100 million, place the greatest importance on services that occur before construction begins or post-construction, specifically, leading the project team, defining responsibilities, addressing design comments, administrating contracts, building budgets and scopes of work, and commissioning or maintenance support.

METHODOLOGY

The first group of survey questions asked owners about their current use of outsourced services across the different stages of a construction project and whether their rate of outsourcing was higher in 2009 than it had been in 2006, and what further change they expected between now and 2014.

The second group of questions presented 28 specific tasks or functions commonly performed by professional construction and program managers and asked owners to determine the importance of each, using a scale that ranged from "not at all important" to "very important." These 28 tasks were derived from a study conducted by CMAA in 2006 to identify the specific components of the Construction Management (CM) profession and associate each of these functions with the *CM Standards of Practice* promulgated by CMAA.

The 2006 study was part of an effort by the Construction Manager Certification Institute (CMCI) to achieve accreditation for its Certified Construction Manager (CCM) program from the American National Standards Institute. The study identified 120 specific job functions in seven general areas: Project Management Planning, Cost Management, Time Management, Quality Management, Contract Administration, Safety Management and CM Professional Practice. It then surveyed practicing CMs to determine the relative importance they assigned to each of these tasks. For the *Tenth Annual Survey of Owners*, FMI and CMAA selected 28 standards of practice from all seven functional areas.

Finally, a third and optional set of questions provided owners with several alternative broad views of the future and asked how likely they thought each scenario was and how it could affect their business.

The survey produced extensive and detailed data presented in this report.

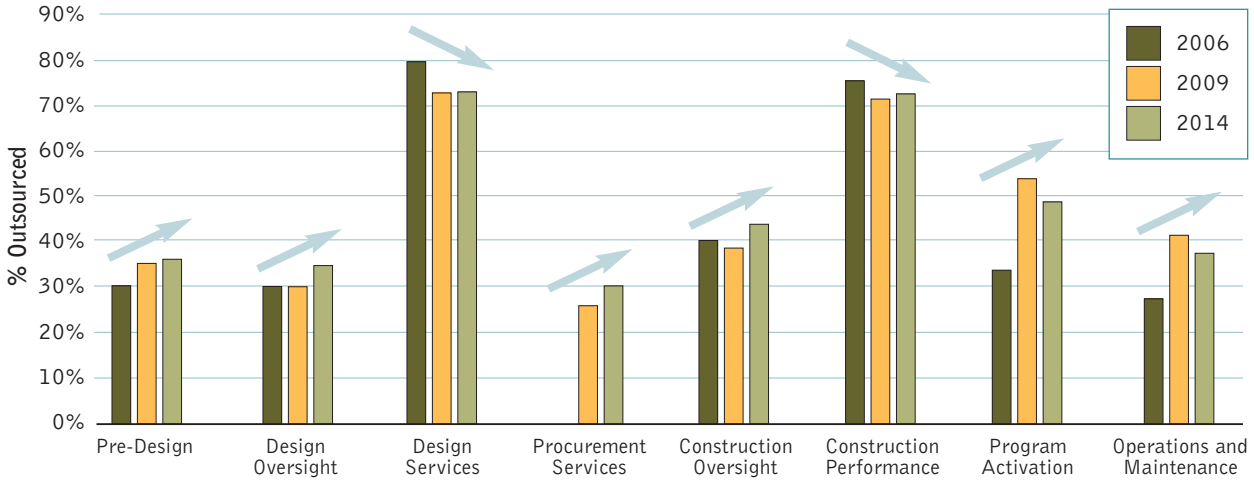
A/E/C FUTURE FOCUS

The concept of an inflection point is built around the expectation that the environment will shift the market players' perspectives and behavior. To better understand these shifts, FMI prepared a series of four scenarios, introducing them, defining implications and describing winning strategies. These scenarios are presented in summary form in the following pages along with the four inflection points identified in this research.

Inflection Point: Outsourcing Acceleration

Use of outsourcing in all project phases either increased between 2006 to 2009 or will increase between 2009 and 2014 (**Exhibit 1**). Design services and construction performance fall in outsourcing frequency between 2006 and 2009 and may be related to the financial crisis and recession of 2008-2009. Many owners either deferred projects or kept many of their pre-construction activities in-house. FMI believes the current decline in outsourcing will reverse once the level of pre-design, design oversight and design activities returns to normal.

Exhibit 1 Outsourcing Trends



Notably, the outsourcing of program activation and O&M will increase significantly, 60 percent and 30 percent respectively, and represents evidence of a long-term trend demanding a broader set of services from traditional design and construction firms. FMI has long believed one of the transformations occurring in the design/construction markets is a shift away from "silo" sourcing of services and toward preferred service providers offering multiple services.

Inflection Point: Perspectives and Experiences Shift Importance of Function

Several services or functions that are viewed as relatively unimportant today will gain dramatically in emphasis over the next five years (**Exhibit 2**). Four of these five "least important" factors in 2009 registered the greatest gains in importance over the next five years.

Falling just outside of the top five, "11c Commissioning: Completion and submission of all commissioning, facility turnover, LEED, and other documentation necessary to support facility transfer or certification obtainable during the post-construction process" demonstrates one of the highest percentage gains in "very" and "quite important" ratings, further reinforcing a shift in perspective between 2009 and 2014.

[Biggest change desired] "Familiarity with sustainable design/LEED"

— National Retail Owner/Developer

Exhibit 2 2009 Lowest Importance Standards of Practice

Standards of Practice	2014 Overall Importance Gain	2014 "Very" and "Quite Important" Gain Only
8c Project Delivery System: Determine the best project delivery system...*	7.1%	16.7%
12b Maintenance Management: Design a maintenance management system...*	9.2%	24.4%
6c Avoid Claims: Develop strategies to avoid disputes and claims *	7.5%	17.7%
6b Find Likely Claims: Identify elements...give rise to disputes and claims	7.3%	14.4%
12c Maintenance Technology: Use GIS, GPS BIM to provide effective maintenance management *	26.4%	83.8%

* Denotes factors registering the greatest gains in importance over the next five years

Inflection Point: Holistic Strategy

These shifts in importance also portend a growing owner emphasis on true life-cycle cost calculation and an ever-stronger desire for contractors to help them predict and control long-term costs. This holistic strategy can be observed by the increasing number of owners using both a program management, versus a project-centric, approach and an asset management approach to capital construction. This approach is demonstrated by the top 10 most important standards of practices containing at least one practice originating from each of the major phases of the construction process. In addition, five of eleven areas most frequently mentioned for improvement by owners relate to or infer the use of a life cycle cost type approach.

The most important services today remain so in the future. Presented in **Exhibit 3** are four depictions of the most important standards of practice or activities as rated by responding owners.

Exhibit 3 Most Important Standards of Practice

2009 Most Important Standards of Practice		2014 Most Important Standards of Practice	
Top 10 Overall Importance	Top 5 "Very" and "Quite Important" Only	Top 10 Overall Importance	Top 5 "Very" and "Quite Important" Only
10c - Work Conformance	10c - Work Conformance	10c - Work Conformance	10c - Work Conformance
9e - Contractor Compliance	9e - Contractor Compliance	9e - Contractor Compliance	9e - Contractor Compliance
10d - Risk Mgt.	8d - Scope of Work	10d - Risk Mgt.	10b - Build Schedule
10b - Build Schedule	11d - Punch List	10b - Build Schedule	10d - Risk Mgt.
8d - Scope of Work	9c - Critical-Path Schedule	8d - Scope of Work	7d - Address Comments
11d - Punch List		6e - Design Conformance	
6e - Design Conformance		6d - Monitor Cost	
11b - Monitor Testing		7d - Address Comments	
7d - Address Comments		9c - Critical-Path Schedule	
9c - Critical-Path Schedule		11b - Monitor Testing	

Today's top two concerns, as measured by the frequency of "very" and "quite important" rankings only, deal chiefly with assuring that a project is built in conformance with the contract documents. They remain the most important considerations five years from now. The third through fifth items in 2014, measured by the frequency of "very" and "quite important" rankings, although new to the "top five" in 2014, are actually ranked sixth through eighth in 2009, and have moved up without changing their order. The three items they replace – scope of work, punch list, and critical path schedule – will fall out of the top five to 13th, eighth and ninth positions, respectively. "8d Scope of work: Developing the scope of work for bid packages" is the only 2009 top five factor that falls out of the top 10 in 2014.

> [Greatest area for improvement] "Lack of critical thinking, communication and writing skills are a major detriment to projects"
>
> — Large U.S. City, Public Works Director

In some cases a relatively small gain in importance rating has resulted in a move of several spaces up the ranking list. For example, "7d Address Comments: Ensure that review comments are adequately addressed during the design phase" is ranked as quite or very important by 85 percent of respondents today and 92 percent for 2014, a gain of 9 percent. This gain was sufficient to move this factor from eighth place to fifth.

Team coordination in some form was mentioned most often across all provider categories. This includes integrated project delivery, more use of BIM, adoption of 3D and 4D design techniques, and similar factors. The processes necessary to implement these types of techniques demand integration across the construction supply chain and are also necessary to utilize a full life cycle or asset management approach to capital construction.

Taken together, the combination of highly important standards of practice and general comments describe an environment where owners of all types are looking for a more effective collaborative approach from their service providers. This is fully consistent with the comprehensive view of projects that is revealed by the other survey questions.

A/E/C FUTURES RESEARCH

What?

During 2008 and 2009, the economic and financial turmoil has resulted in a dramatic shift in the way the business environment for the architecture, engineering and construction (A/E/C) industry will affect the participants. FMI/AMI undertook a research effort to better define this shift and support industry participants in addressing the following:

- Clearly define critical uncertainties and certainties
- Identify as many potential wildcards as possible and bring them to light
- Articulate strategic implications of each scenario and describe the resulting market shape
- Share winning strategies that will leverage or defend against the strategic implications

The responses to these areas answer a key question, "What might that future look like?" FMI/AMI described four possible futures to engage and stimulate senior leaders as they struggle with the development of robust strategies to ensure their firms thrive over the coming generation.

Why?

The conventional wisdom is that the A/E/C industry does not shape its own destiny; instead, it reacts and responds to the economy, owner demands, labor needs, etc. The typical planning cycle for the majority of firms is 1-3 years into the future and in some ways reflects this conventional wisdom in that you can't plan long term in the A/E/C industry. FMI/AMI are not subscribers to this view and as uncertainty increases, as it has done over the last 12-15 months, other planning tools to uncover and explore the future potential risks and opportunities are necessary.

How?

The FMI/AMI team completed a comprehensive and collaborative scenario planning process with over 50 industry leaders. Four scenarios were selected by this group describing very different yet plausible images of what the A/E/C industry might look like in 2020.

Who?

FMI/AMI's core research team included Lou Marines, Project Director; Sabine Hoover, Project Manager; Phil Warner, Research Consultant; Kevin Haynes, Senior Research Analyst; and Janet Manley, Project Coordinator. The external project participants included two groups: the Steering Committee, made up of 14 leaders from both industry and academia, and the Advisory Group, made up of an additional 36 leaders covering all service types and industry sectors.

Resources:

On October 29, 2009, FMI/AMI hosted an international forum to present the results of the last 12 months research efforts. The agenda includes a keynote kickoff by renowned futurist, Watts Wacker, discussing his thinking on "Once Upon the 21st Century." Additional recognized industry leaders discussed their perspectives on four possible scenarios describing potential shapes of the 21st century A/E/C markets. Further resources related to this forum, the A/E/C Futures Research, and other FMI/AMI information are available at www.aecfuture.com or from Lou Marines, Project Director (lmarines@ami-institute.com or 707.431.8068) or Sabine Hoover, Project Manager (shoover@fminet.com or 303.398.7238).

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Scenario 1: Perfect World View

Introduction

The world's economy has fully recovered from the Great 2008-2009 Recession and rebounded beyond expectations by 2020. The flattening world has become a global and interdependent marketplace where private investment, low-cost capital, expertise, goods and services flow readily across industry or market segments and national borders. Levels of innovation and collaboration are high, with governments and private firms working to build each nation's unique brand. Experts from many disciplines and countries work together to design and build projects with the highest degree of sustainability through a set of integrated project delivery practices that leverage technology to both accelerate the speed of design/construction and reduce risk. Our collective best minds attack common design/construction problems and find solutions to both global and local design and construction challenges, sparking worldwide interest in creating better, sustainable, functional communities and infrastructure.

Perfect World View

Global	Social	Technological	Economic	Political	Environmental
• Very stable geopolitical environment • Intensified globalization • Smaller, flatter world	• Diverse, mobile workforce • High demand and competition for A/E/C talent • Sustainability as a key social value • Sophisticated public infrastructure	• Rapid technological progress • Innovative A/E/C culture • Industry-wide standards and interoperability	• Strong GDP growth • Strong financial investment in A/E/C industry (public and private) • Strong adoption of public-private partnerships	• Widespread adoption of A/E/C industry codes and regulations at national and global level	• Strong control and protection of the natural and built environment • National and global initiatives drive carbon footprinting in design and construction processes

Implications

- Owners and service providers have access to low-cost capital
- Owners execute based on longer-term thinking and business relationships with service providers
- Aging infrastructure, aging workforce, environmental requirement and other big picture challenges are resolved with big picture solutions
- Owners build deeper relationships with smaller number of suppliers offering more services
- Geographic footprint for both owners and service providers is large
- Technology is a primary driver, whereas social, economic, political and environmental are weaker drivers
- Front end (pre-design and design phases) and back end (program activation, commissioning, and O&M phases) are of higher value to larger set of owners
- Integrated project delivery that leverages both process and technology (such as BIM) increase in use

Winning Strategies

- Establish a national or international footprint
- Service driven — develop a culture of collaboration for both process and technology
- Superior performance and capability in alternative delivery system application
- Capability to deliver a broad set of services, particularly front end and back end
- Drive business processes using innovation and technology
- Superior "sell work" capabilities more important than superior "price work" capabilities

Scenario 2: Struggle for Stability

Introduction

It took longer than expected to get through the Great 2008-2009 Recession, with globalization slowing down and both businesses and governments focusing on rebuilding their local economies. Fears of "too big to fail" have led communities and governments to take a somewhat protectionist stance resulting in closely held local jobs, expertise, materials and resources. Through continued government stimulus efforts and resulting public infrastructure investments, local pockets of prosperity start to emerge and spread, yet the overall economy struggles to stabilize. Private capital flows slowly back into the A/E/C market as the permitting and approval process now runs through both federal bureaucracies and local politicians with their hands out raising the risk to financiers. Design and construction firms have become more lean and competitive; nonetheless, innovative project approaches and partnerships provide some market participants with work firms never would have realized otherwise. Recessions tend to spark new business and innovation, and the Great 2008-2009 Recession is no exception.

Struggle For Stability

Global	Social	Technological	Economic	Political	Environmental
• Unstable geopolitical environment • Globalization slows down • Governments focus on improving their local situations	• Social disparities increase; middle class is threatened • Strong emphasis on building local human capital • Crumbling public infrastructure	• Rapid tactical technological progress ("leapfrogging" of dirty technologies) • Grass-roots approach to improving collective well-being drives innovation	• Slow GDP growth • Government stimulus programs provide foundation for attracting private capital in A/E/C markets • Protection of local industries • Emergence of "pockets of prosperity"	• Unstable local politics and continuous regional disputes • Undue political influence and lobbyists impact development of capital projects	• Local initiatives drive sustainable business practices in design and construction • Focus on using local materials and resources

Implications

- Local and national service providers dominate
- Tight ties to federal, state and municipal government bodies are critical for service providers
- Organized labor tends to be advantaged
- Alternative financing is needed by owners and used by contractors/service providers
- Technology is applied to create small solutions to small problems
- Political is the primary driver, whereas global is the weakest driver
- Price is the dominant decision driver for owners in service provider selection
- Innovative owners and service providers attack bottlenecks (aging workforce, aging infrastructure, skill building, etc.), typical owner responding to issues as they arise
- Qualified owners and service providers have access to moderately expensive capital

Winning Strategies

- Ability to orchestrate or provide financing
- Horse picking (finding the pockets of prosperity and pursuing work there)
- Tight political connections
- Ability to operate in a unionized environment
- Design execution and field productivity-driven culture
- Marketing, sales, and execution differentiation

Scenario 3: Building Walls

Introduction

The Great 2008-2009 Recession drags on for years, with small gains unraveled by repeated monetary crises. Protection and survival become the focus of every country, community, city and corporation. As the walls of protectionism go up, partnerships and alliances within industries and across borders fall apart. Resources of all types are in short supply and competition for them is fierce. Consequently, governments throw themselves into defense spending and build more secure borders to protect their assets and demonstrate power and authority. Within the A/E/C industry, business relationships are tense and litigious, with owners placing tremendous pressure on design and construction firms to come up with low cost solutions. As a result, many design and construction firms have lowered their standards, taken on more risk and developed creative ways to deliver projects with fewer resources. Furthermore, what used to be called unethical business practices are now commonplace.

Building Walls

Global	Social	Technological	Economic	Political	Environmental
• Very unstable geopolitical environment • Slow down in globalization; very limited cross-border collaboration • Governments focus on protection and survival	• Large social disparities • Very high levels of unemployment • Limited skilled workforce • Very rudimentary public infrastructure	• Low levels of innovation and knowledge sharing • Limited industry-wide technology standards • High emphasis on defense technologies	• Negative GDP growth • Financial investment in A/E/C industry limited to defense-related projects • Restrained exports of materials to ensure supply for local needs	• Local regulation and nationalistic protectionism dominate • Strong restrictions on labor mobility (limited crossborder collaboration)	• Drive toward sustainability has come to a halt • Most readily available resources used, irrespective of environmental impact

Implications

- Training and skill building at a premium
- Owners buy locally to reflect local conditions
- Owners make defensive spend (O&M) versus offensive spend (Capital)
- Capital is expensive and restricted to only the most qualified owners and service providers
- Price or local connection is selection driver for owners
- International service providers/firms not associated with region are disadvantaged
- Social, economic and political are primary drivers, whereas global and environmental are weakest drivers
- Personal and business relationships are paramount in geographies that achieve stability or consistency in social, economic and political arenas and less important in geographies that are unstable or inconsistent in these arenas
- Safety performance is poor
- Aging workforce management in A/E/C Industry is in crisis mode

Winning Strategies

- Geography driven - being local or appearing to be local
- Control of scarce resources, particularly highly skilled staff; access to high value add materials; use of labor saving equipment; and development or use of cost and labor saving technology
- Lead with locally developed and implemented business strategy rather than corporately developed strategy
- Extreme design execution and field productivity-focused culture
- Superior "price work" capabilities more important than superior "sell work" capabilities

Scenario 4: Controlled Environment

Introduction

Capitalism may never again look like it did in the past decades. In response to the laissez-faire days of deregulation and individual pursuits, the national governments across the globe have seized control of pillar industries to reduce the national deficit and stabilize the local economy. Under these circumstances, the A/E/C sector is considered key to influencing economic and development policies: what gets planned, designed and built along with directives of when, where and by whom are part of the latest ten-year stimulus plan. Unfortunately, an inevitable increase in bureaucracy slows production on the majority of design and construction projects, all of which must satisfy stringent government requirements for technology platforms, design specifications, materials, labor and cost. The scale of projects and developments constructed through forced collaboration is impressive to say the least; however, lateral thinking is not appreciated in a world where government knows best.

Controlled Environment

Global	Social	Technological	Economic	Political	Environmental
• Stable geopolitics; highly regulated political and economic environment • Governments focus on improving their local situations	• Thoroughly planned and controlled socio-cultural environment • Strong unionization across all industry sectors • Extensive, solid public infrastructure	• Governments place high emphasis on R&D • Rapid technological progress • Industry-wide standards mandated at federal level	• Slow but steady GDP growth • Governments control strategic industries (including A/E/C) and allocation of key resources • Restrained exports of materials to ensure supply for local needs	• Industry regulations and policies dictated at federal level • Labor rates and mobility dictated by unions and controlled by governments	• Emphasis on sustainability of the built and natural environment • Governments mandate regulations and policies for accessing and using natural resources

Implications

- International firms without some type of cross-border ownership are disadvantaged
- Design/Bid/Build favored to demonstrate prudency of spending to taxpayers/voters
- Capital available but allocation controlled or influenced by government agencies
- Owners and service providers tend to add staff allowing for more oversight and control
- Owners tend to self-perform more supply chain functions internally
- Consolidating of industries through regulation is demanded to support simpler governmental oversight

Winning Strategies

- Establish a regional/national footprint
- Geography driven - local offices connected to municipal/state/federal agencies
- Superior "compliance work," both design/construction execution and paperwork, is more important
- Ability to operate in a unionized environment

Inflection Point: Dominant Forces Shaping A/E/C Industry

A combination of FMI's research and responses to the *Tenth Annual Survey of Owners* support the identification of six forces that are dominant in defining the inflection points discussed. These forces are described below and discussed more fully in the context of each of the four presented scenarios.

- **Globalization** - tendency for or against free trade, levels of international hostilities or peaceful relations and the ability of companies and citizens to work, travel and immigrate internationally

- **Social norms, mores, and expectations** - differences between classes, education and training levels, relations between people and organizations, desire and ability to relocate and societal aspirations or expectations

- **Technology application and innovation** - research, development and application of innovations and technologies, particularly as they affect the A/E/C industry in process use and application of labor and other resources; examples include Building Information Modeling (BIM), nanotechnology applications for new materials, etc.

- **Economic performance** - macro economic trends or tendencies both globally and nationally for money supply, debt, lending practices and growth expectations particularly as these factors affect the A/E/C industry

- **Political stability** - trend toward or away from democratic societies, the maturity or stability of governments, levels of corruption or lack thereof and the tendency to be bureaucratic or lean and efficient

- **Environmental influence** - rate at which peoples embrace practices that lead to cleaner air and water, alternative energy sources and sustainable living practices especially as it affects the built environment

SURVEY RESULTS

FMI and CMAA developed a series of questions to test the owners' shifting perspectives using past data collected from the 2006 owners study[1] and then contrasting it with responses reflective of both today and forecasting out to 2014. Owner rated each service in the context of where it falls on the supply chain and described its importance to their capital construction program and how frequently they outsourced it. As described earlier, the 28 standards of practice tested originate from a list of 120 items developed by CMAA. These 28 services are organized across the capital construction supply chain in eight steps and presented in summary names in **Exhibit 4** and with full descriptions in **Exhibit 11**.

Exhibit 4 Services/Standards of Practice Organized Along Supply Chain

Pre-Design	Design Oversight	Design Execution	Procurement Execution	Construction Oversight	Construction Execution	Program Activation	Operations and Maintenance
CM Plan	Find Likely Claims	Site Conditions	Contract Administration	Short-Term Schedule	Build Schedule	Monitor Testing	Maintenance Management
Lead Project Teams	Avoid Claims	Discipline Coordination	Build Budget	Critical-Path Schedule	Work Conformance	Commissioning	Maintenance Technology
Define Responsibilities	Monitor Costs	Address Comments	Scope Of Work	Analyze Delays	Risk Management	Punch List	
Integrate Budgets	Design Conformance		Project Delivery System	Contractor Compliance	Project Communication		

In 2006, FMI and CMAA tested the frequency of outsourcing of services falling under each of the supply chain steps. Construction performance and design services were the most heavily outsourced phases of construction[2] (**Exhibit 5**). A comparison to 2009 responses and 2014 expectations demonstrates greater use of outsourcing in each phase between 2006 and 2014, except in design services and construction performance. The design services function typically precedes construction execution by six months to two years. In 2006, the level of outsourcing represented a high watermark for activities and demanded more outsourcing. The providers of these types of services began to see the slowdown in activity in 2008. Once the financial crisis was in full swing in October 2008, owners both reduced their pre-construction activities and pulled those activities still being performed in-house to make use of internal resources. FMI believes this is a short-term trend and will reverse once the level of pre-design, design oversight and design activities return to normal. This is in part visible in both design services and construction performance, the level of 2014 outsourcing is equal or higher than 2009.

In 2009, federal agencies show some of the most dramatic change in an across-the-board increase in outsourcing. As noted above, program activation and O&M are both significantly up in outsourcing use in part due to the use by federal agencies (**Exhibit 6**).

[1] FMI Corporation, *Seventh Annual Owners Study,* "C² + 2C = LC; The solution to low cost capital programs," Raleigh, NC, 2007.

[2] Ibid pg. 10.

Exhibit 5 2006 Percent of Outsourcing by Phase of Construction Compared with Organization Type

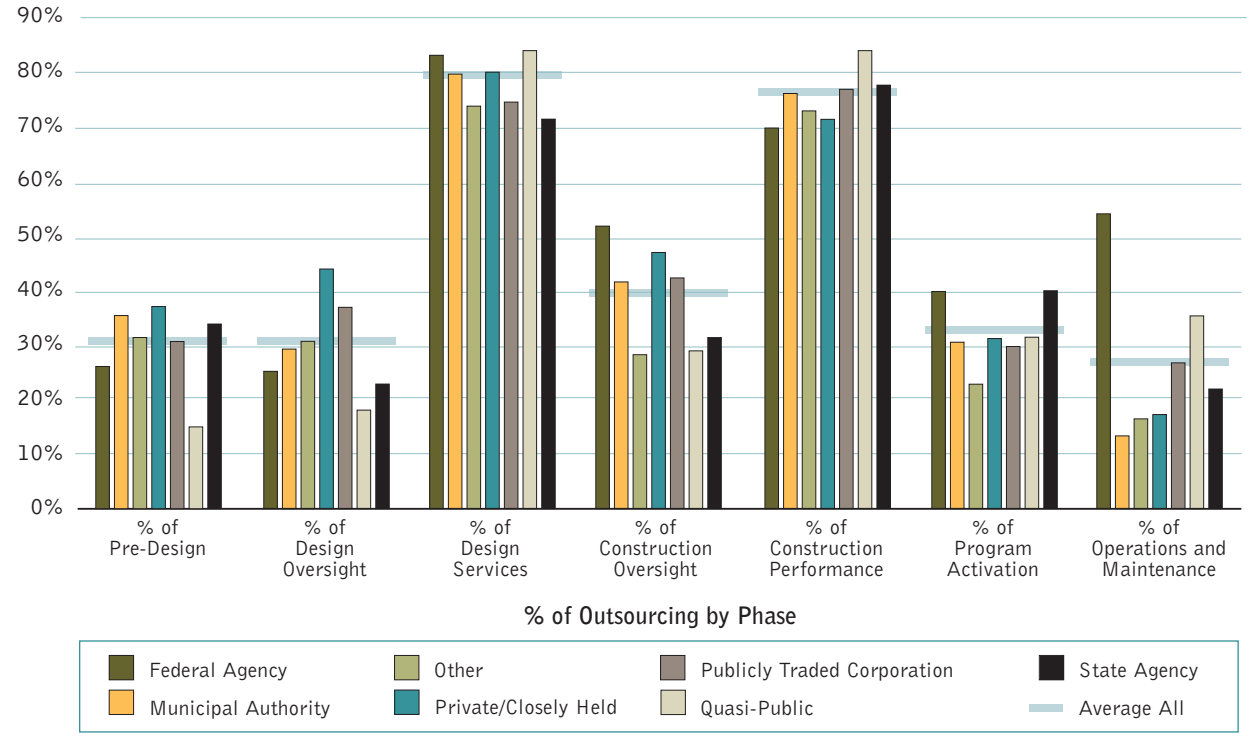
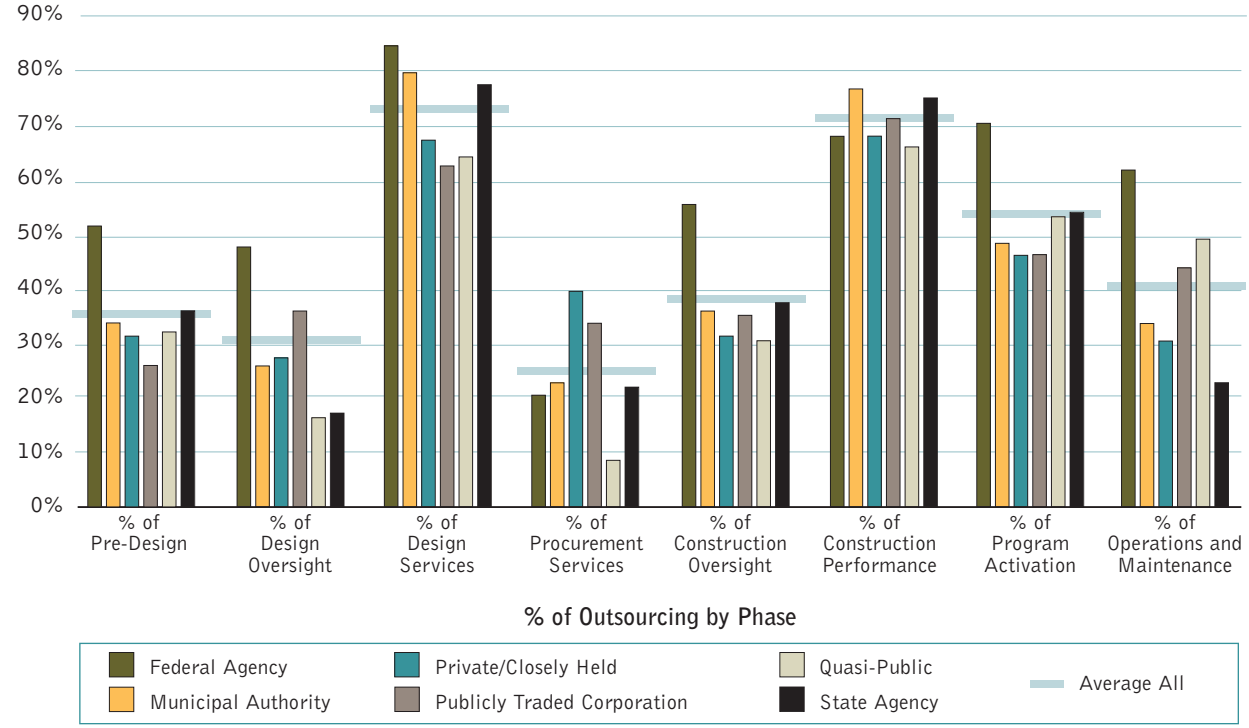
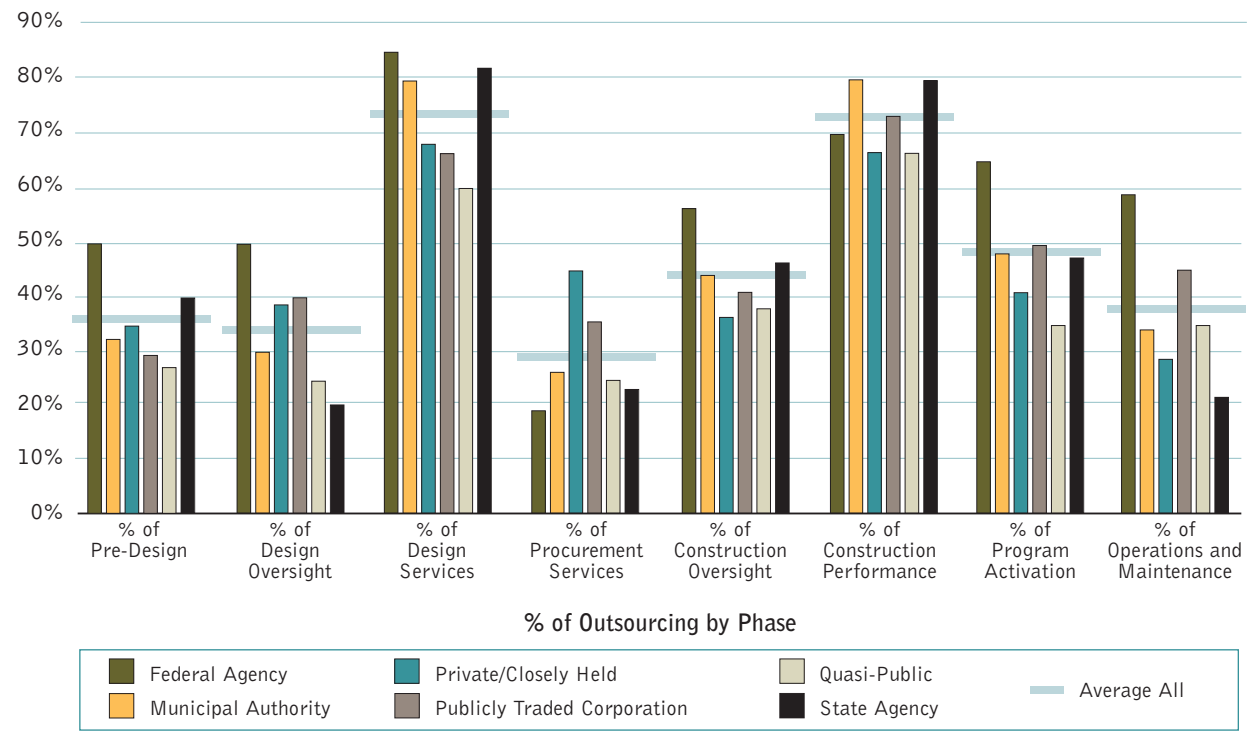


Exhibit 6 2009 Percent of Outsourcing by Phase of Construction Compared with Organization Type



By 2014, a general increase in outsourcing is expected across all phases of construction (**Exhibit 7**). Notably, public agencies at the federal and state level expect outsourcing to level off. It is not clear what is driving this change, but a number of areas are in motion that are likely impacting it. First, based upon FMI's analysis of the American Recovery and Reinvestment Act (ARRA), only about 10 percent of the $787 billion in stimulus spending will go directly to execute construction.[3] This figure primarily represents spending at about the high water mark for many public agencies, not a significant increase in spending and the related increase in outsourcing. Second and perhaps more important, the plans regarding how these and other funds will be spent are in flux. The Obama administration seems antagonistic towards outsourcing of program management and construction management functions. Following the release of a memorandum from the White House titled "Memorandum for the Heads of Executive Departments and Agencies – Government Contracting" on March 4, 2009, the President completed a press conference where he said, "We will stop outsourcing services that should be performed by the government and open up the contracting process to small businesses. We will end unnecessary no-bid and cost-plus contracts that run up a bill that is paid by the American people."[4] The General Administration Services (GSA) apparently took heed of President Obama's words and announced the creation of a nationally managed, regionally executed program management office to support the delivery of stimulus projects using more internal resources.[5] Federal agencies anticipate less outsourcing through 2014, perhaps due to efforts previously described that encourage internal resource use.

Exhibit 7 2014 Percent of Outsourcing by Phase of Construction Compared with Organization Type



[3] Jones, Heather, FMI's *Construction Outlook First Quarter 2009 Report*, March 2009, pg. 1.

[4] Obama, Barack, President of the United States, Press Conference, March 5, 2009.

[5] Prouty, Paul, Acting Administrator General Services Administration, Testimony before the Committee on Transportation and Infrastructure, U.S. House of Representatives, April 29, 2009.

Relevance and Importance of Services

A total of 28 activities to support all phases of capital construction program were tested to establish relevance and importance to owners. In all instances, the standards of practice tested are viewed as being more important as we move into the future. **Exhibit 10** presents each of the 28 standards of practice tested in the *Tenth Annual Survey of Owners*. The frequency of the selection of "very important," "quite important," "fairly important," "slightly important," "not at all important," and "not applicable" is described in this same exhibit. **Exhibit 8** provides the five questions demonstrating the most consistent answers, meaning the responses vary widely. In both cases, standard deviation of the responses measures the degree of consistency. The degree of consistency can also be observed in **Exhibit 10** by the data exhibiting more balance between the available importance choices. As an example, "6b - Find Likely Claims" in **Exhibit 10** shows many more respondents selecting "slightly important" and "not at all important" than the surrounding question and it is one of the top five least consistent questions.

The 2009 most consistent ratings reflect standards of practice that were also the most important practices. The least consistent practices tended to be of lower overall importance. An expansion of the list of least consistent practices to 10 demonstrates that nearly all of them originate from either the earliest or latest supply chain steps of pre-design or design and post-construction respectively. It is FMI's opinion that this observation is linked to more owners demanding a broader set of services across the supply chain yet a large group of owners still view and apply these services in a silo approach. By 2014, the degree of inconsistency falls for the 2009 top five least consistent and on average, their importance demonstrates the most dramatic increase, reinforcing the trend of owners demanding a broader set of services across the supply chain.

Exhibit 8 2009 Most and Least Consistent Importance Ratings

Top 5 Most Consistent (Lowest Standard Deviation)	Top 5 Least Consistent (Highest Standard Deviation)
10c - Work Conformance	12c - Maintenance Technology
9e - Contractor Compliance	8e - Project Delivery System
11d - Punch List	6b - Find Likely Claims
10d - Risk Mgmt.	6c - Avoid Claims
11b - Monitor Testing	5d - Define Responsibilities

Owners believe that the importance of all components of the capital construction supply chain will increase over time. Items rated most important in 2014, as defined by over 92 percent of responses as "Very" or "Quite Important", include:

- **7d Address Comments**: Ensure review comments are adequately addressed during the design phase
- **9e Contractor Compliance**: Monitor contractor compliance with contract requirements
- **10b Build Schedule**: Develop construction schedule
- **10c Work Conformance**: Manage conformance of work to contract documents during the construction phase
- **10d Risk Management**: Monitor risk management and implementation of safety plans

Surprisingly, "6c Avoid Claims" ranks among the least important elements of construction program management. This may be a result of more complex risk management practices which received high importance ranking.

Different types and sizes of owners rate the importance of each standard of practice differently. In 2009, private/closely held firms rated 20 of the 28 standards of practice with scores falling below the average of all respondents indicating less use, need, and importance of these functions. Conversely, publically traded firms and state agencies rated 21 and 20 of the 28 standards of practice respectively, above the average of all respondents indicating more use, need, and importance of these function. Federal agencies and municipalities are much more balanced essentially splitting the ratings of practices with half above and half below the overall average rating (**Exhibit 9**).

Exhibit 9 Importance Rating by Type of Owner and Annual Capital Spending

Owner Type/Size	Theme	Descriptions
Today		
Private/Closely Held	Broad support needed, particularly front and back end	Items rated as having **higher** importance 5c - Lead Project Teams 5d - Define Responsibilities 5e - Integrate Budgets 6b - Find Likely Claims 6c - Avoid Claims 8e - Project Delivery System 10d - Risk Mgt. 11c – Commissioning
Today and in the Future		
Publicly Traded	Tactical help not desired	Items rated as having **lower** importance 6b - Find Likely Claims 6d - Monitor Cost 7d - Address Comments 8c - Build Budget 8d - Scope of Work 10c - Work Conformance
State or Provincial Agencies	Upfront activities in house, we need less help	Items rated as having **lower** importance 5b - CM Plan 5c - Lead Project Teams 5e - Integrate Budgets 6b - Find Likely Claims 6c - Avoid Claims 9c - Critical-Path Schedule 9e - Contractor Compliance 10d - Risk Mgt.
Annual Spend Greater than $500 Million	Tactical help not desired	Items rated as having **lower** importance 6b - Find Likely Claims 8c - Build Budget 8d - Scope of Work 10b - Build Schedule 11c – Commissioning
In the Future		
Federal Agencies	Upfront help, along with construction oversight support is important	Items rated as having **higher** importance 5c - Lead Project Teams 6b - Find Likely Claims 6c - Avoid Claims 6e - Design Conformance 9b - Short-Term Schedule 9d - Analyze Delays
Municipal Authorities	Claims support and compliance assurance is important	Items rated as having **higher** importance 6b - Find Likely Claims 9e - Contractor Compliance 10c - Work Conformance 11d - Punch List

Exhibit 10 Rating of Importance (1 of 2)

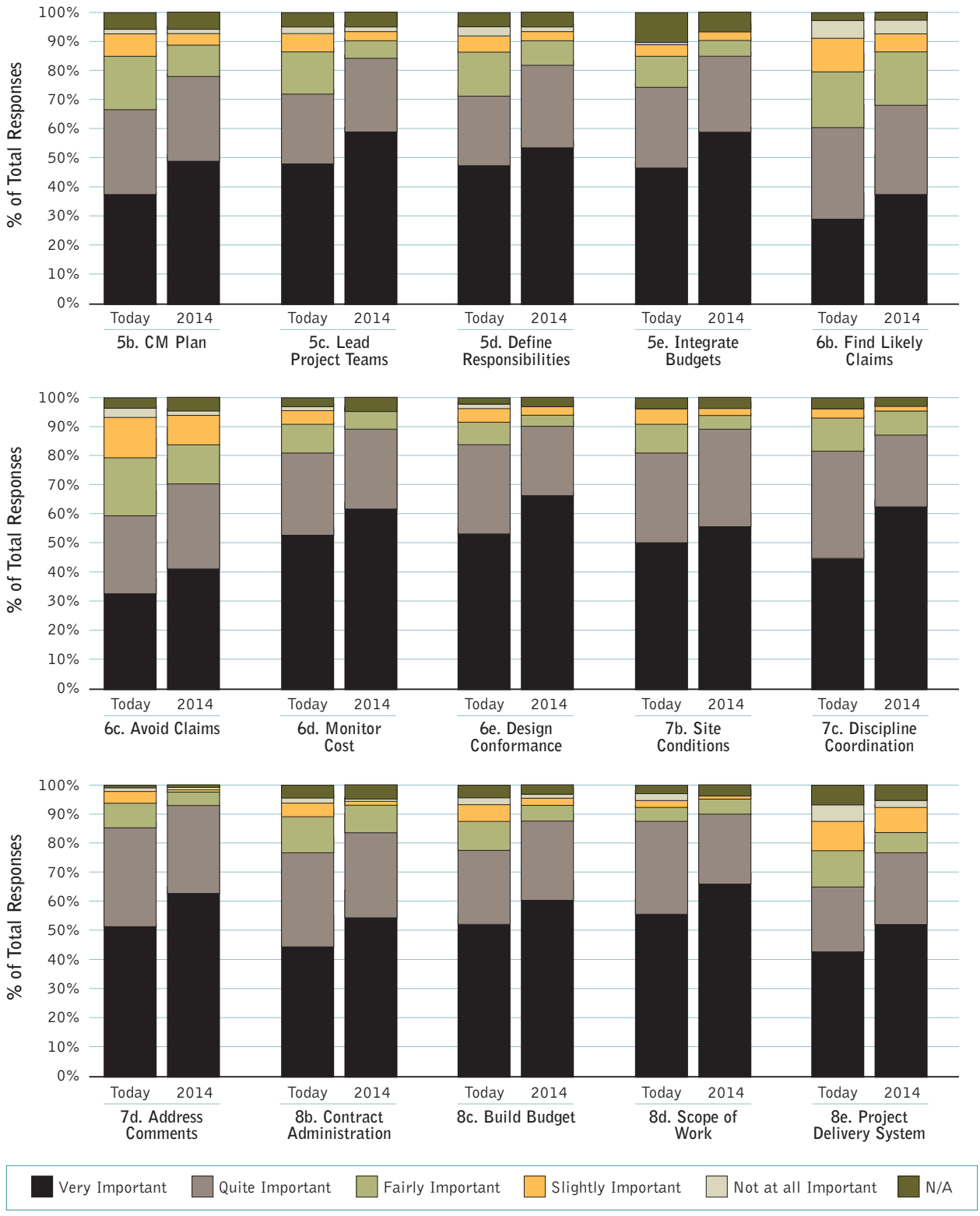


Exhibit 10 Rating of Importance (2 of 2)

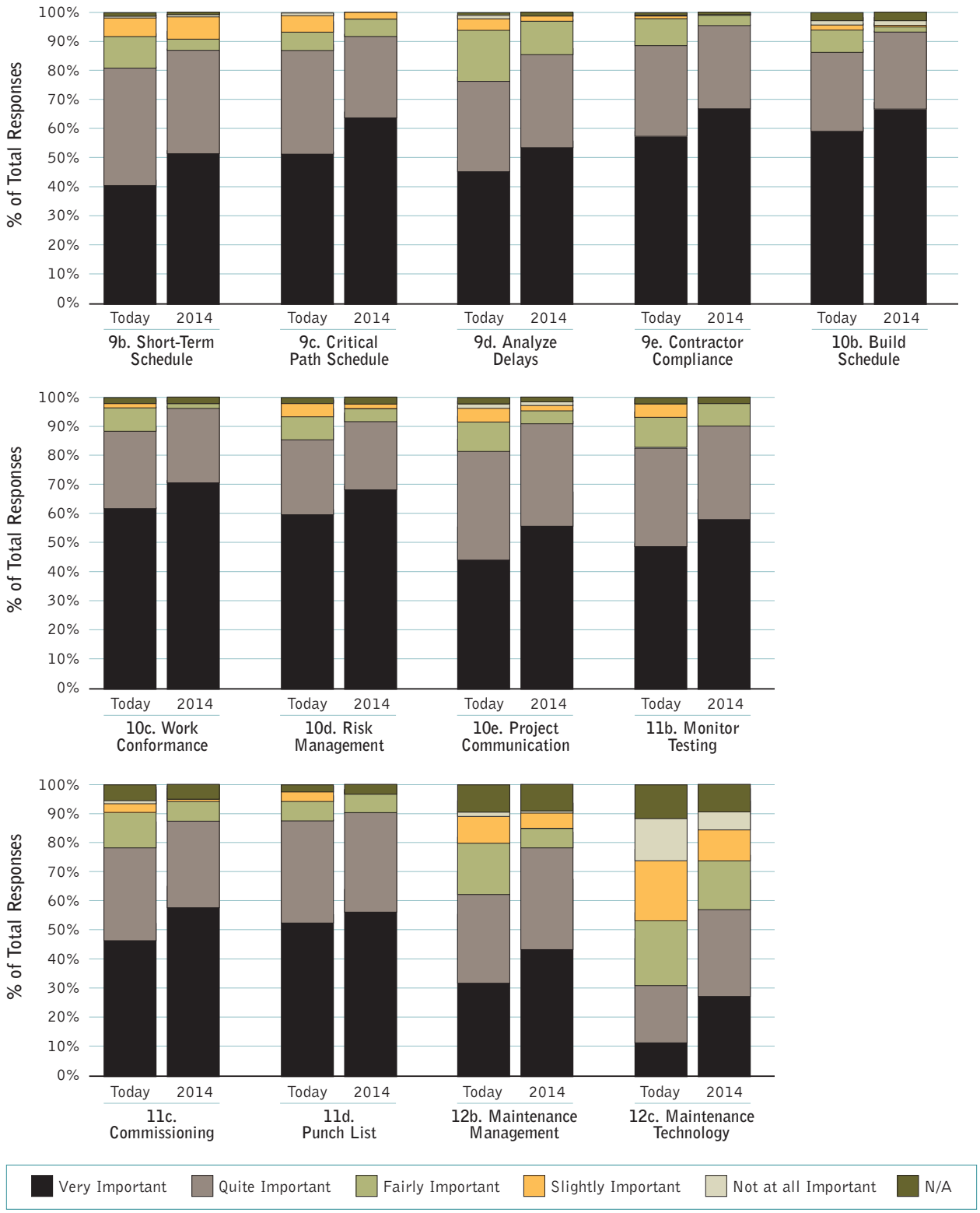


Exhibit 11 Standards of Practice Question Listing

Q#	Summary	Full Question
Pre-Design Phase - 5: Performance of Pre-Design Services		
5a	N/A	What percentage of activity involved with the pre-design phase of your program is outsourced today and in 2014?
5b	CM Plan	Develop and implement the Construction or Project Management Plan using measurable goals and objectives that define a successful program or project.
5c	Lead Project Teams	Organize and lead project teams by implementing project controls, defining roles and responsibilities and developing communication protocols.
5d	Define Responsibilities	Define responsibilities and management structure of project management team.
5e	Integrate Budgets	Interpret and integrate conceptual budgets provided by the owner and assess impacts on the project cost.
Design Phase - 6. Oversight and Management of Design Services		
6a	N/A	What percentage of the oversight of design phase services is outsourced today and in 2014?
6b	Find Likely Claims	Identify elements of project design and construction likely to give rise to disputes and claims.
6c	Avoid Claims	Develop strategies and procedures to avoid disputes and claims.
6d	Monitor Cost	Monitor cost as the design is developed.
6e	Design Conformance	Review design documents for conformance with scope and budget requirements.
Design Phase - 7. Performance of Design Services		
7a	N/A	What percentage of the performance of design services is outsourced today and in 2014?
7b	Site Conditions	Identify unique site conditions and their impact on construction sequencing and operations.
7c	Discipline Coordination	Review design documents for coordination between disciplines.
7d	Address Comments	Ensure review comments are adequately addressed during the design phase.
Procurement Phase - 8. Performance of Procurement Services		
8a	N/A	What percentage of the performance of procurement services is outsourced today and in 2014?
8b	Contract Administration	Develop contract administration and documentation procedures.
8c	Build Budget	Develop project budget taking into consideration project and owner objectives, cost constraints, and procurement strategies.
8d	Scope of Work	Develop scope of work for bid packages.
8e	Project Delivery System	Determine what project delivery system(s) or method(s) best fits your program or project.
Construction Phase - 9. Oversight and Management of Construction		
9a	N/A	What percentage of the oversight of construction is outsourced today and in 2014?
9b	Short-Term Schedule	Review detailed short-term schedules with contractor(s).
9c	Critical-Path Schedule	Develop and manage a critical-path schedule.
9d	Analyze Delays	Analyze concurrent delays, compensable and non-compensable delays.
9e	Contractor Compliance	Monitor contractor compliance with contract requirements.
Construction Phase - 10. Construction Performance		
10a	N/A	What percentage of construction performance activity is outsourced today and in 2014?
10b	Build Schedule	Develop construction schedule.
10c	Work Conformance	Manage conformance of work to contract documents during the construction phase.
10d	Risk Management	Monitor risk management and implementation of safety plans.
10e	Project Communication	Organize and lead team member communication and interaction.
Post-Construction - 11. Program Activation, Commissioning, and/or Turnover		
11a	N/A	What percentage of your program activation activities are outsourced today and in 2014?
11b	Monitor Testing	Monitor the acceptance and performance testing to see that it is conducted in accordance with contract requirements.
11c	Commissioning	Completion and submission of all commissioning, facility turnover, LEED, and other documentation necessary to support facility transfer or certification obtainable during the post-construction process.
11d	Punch List	Develop the project punch list of remaining contract work and ensure it is completed by the specified time frame.
Post-Construction - 12. Operations and Maintenance		
12a	N/A	What percentage of operations and maintenance activities are outsourced today and in 2014?
12b	Maintenance Management	Design a maintenance management system to address issues of maintenance effort, schedule, materials required, and spare parts inventory.
12c	Maintenance Technology	Utilize Geographic Information Systems, Global Positioning Systems and Building Information Management Systems to provide effective maintenance management.

General Questions

Owners were asked to define the areas of greatest improvement potential for various function types and team coordination, including more use of BIM, integrated project delivery, and 3D/4D design techniques, accounted for 18 percent of all responses. This was the number one area of improvement for every group or function type with the lone exception of labor/unions, for which knowledge transfer and safe workplace were the most frequently mentioned. **Exhibit 12** breaks down the major improvement themes that emerged for each function type.

Eleven themes account for 48 percent of all responses and these themes are presented below with their percentage contribution. The remaining comments covered a wide range of topics representing 1 percent or less of all responses.

1. Team coordination through process, accelerated with technology (18%)
   (This was the number one response for all function types with the exception of represented labor/unions)
2. Cost control and management (6%)
3. Sustainability in design, construction, and operations opportunities (5%)
4. Document control to reduce risk or error and raise quality (4%)
5. Safe workplace (3%)
6. Knowledge transfer as a solution to experience shortfall and aging workforce issues (3%)
7. Shorten concept to completion timeline (3%)
8. Communication improvement to drive efficient capital spend (2%)
9. Process and production improvement (2%)
10. Risk management (1%)
11. Technology applied to accelerate process (1%)

Exhibit 12 General Questions Summary by Market Segment

Function Type	Comment Theme
Architects	■ Team coordination first with 24 percent, highest single percentage indicating greater importance or focus from this group is necessary ■ Document quality issues was second most frequently mentioned with 10 percent of all architect responses
Engineers	■ Sustainability issues in design were the second most frequently mentioned comment
Program Management Firms	■ Team coordination first with 14 percent, lowest single percentage indicating lowest importance or focus from this group is necessary ■ Cost control and management was second most frequently mentioned
Construction Management Firms	■ Team coordination first with 15 percent, second lowest single percentage indicating lowest importance or focus from this group is necessary ■ Cost control and management was second most frequently mentioned
General Contractors	■ Safe workplace was the second most frequently mentioned
Trade Contractors	■ Safe workplace was the second most frequently mentioned, followed closely by shortening concept to completion timeline
Represented Labor/Unions	■ Only group where team coordination was not the number one mentioned area for improvement ■ Safe workplace was the most frequently mentioned, followed closely by knowledge transfer issues
Your Firm's Senior Management	■ Cost control and management was second most frequently mentioned
Your Project Team	■ Communication improvement was the second most frequently mentioned

DEMOGRAPHICS

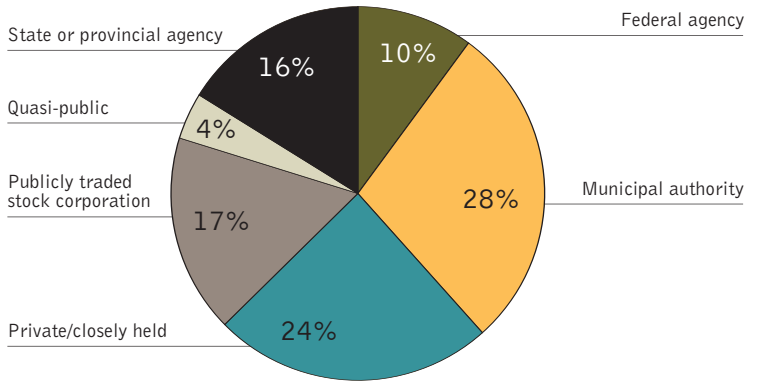
The FMI/CMAA *Tenth Annual Survey of Owners* had 191 international participants representing every owner type, type of construction, industry sector, and geography. The annual capital construction expenditures reported from this group of owners totaled approximately $71 billion and covers an estimated 7,000 projects annually. Twenty-seven owners, approximately 15 percent, reported annual capital construction spending over $1 billion.

Municipal authorities make up the largest respondent type at 28 percent in **Exhibit 13**. Together, publicly traded stock corporations and private/closely held firms make up roughly one third of organization types with 31 percent. In 2008 and 2007, publicly traded stock corporations and privately/closely held accounted for over 40 percent of the respondents.

No particular type of construction dominated the results of the survey. Two types demonstrated greater than 10 percent of the total responses and an additional eight types generating 5 percent or greater in **Exhibit 14**. Office/professional makes up the largest single group at 14 percent followed closely by education at 12 percent. In the 2008 study[6], a much larger group of manufacturers and energy firms reported large capital programs which have fallen in both size and number. This shift makes the mix of construction types more similar to the result of the 2007 study[7].

Fifteen percent, or 27 owners, reported annual capital project spending over $1 billion and an additional 8 percent reported programs between $500 million and $1 billion in size in **Exhibit 15**. In combination, over 50 percent of the owner participants reported programs ranging from $26 million to $500 million in size. In comparison to the 2007 and 2008 studies, the number of programs greater than $500 million has decreased and the number of programs $100 million and smaller has increased. This is in part driven by economic factors as well as a reduction in publically traded owners participating in the study.

Exhibit 13 Survey Respondents Segmented by Type of Owner



[6] FMI Corporation, Ninth Annual Owners Study, "Beyond the Bell Curve: A Report on Managing Capital Project Risk," Raleigh, NC, 2008.

[7] FMI Corporation, Eighth Annual Owners Study, "The Perfect Storm – Construction Style," Raleigh, NC, 2007.

Exhibit 14 Owner Response by Industry Sector

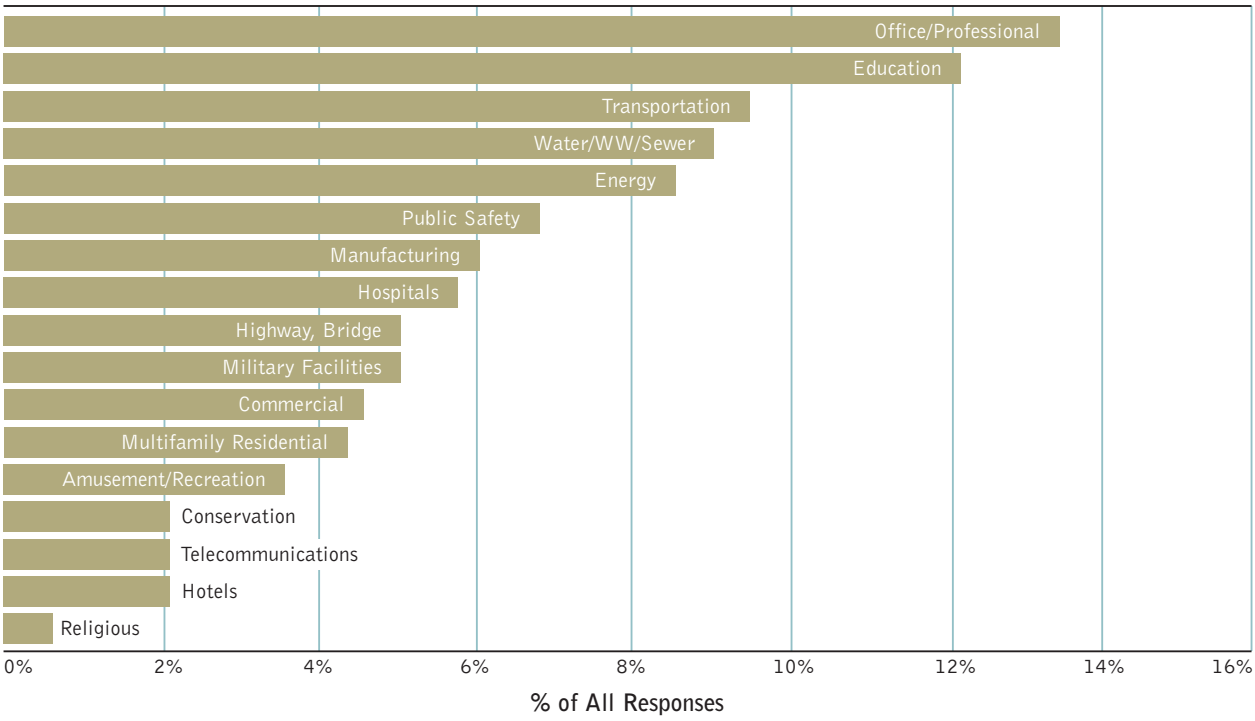
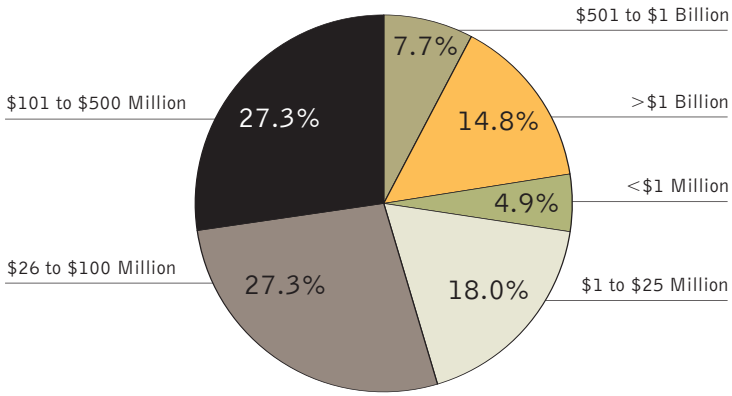


Exhibit 15 Annual Construction Capital Spending



FMI has made an intentional effort to increase the amount of international participation in the owners study in order to contrast U.S. and North American trends with those worldwide. Seventy-four percent of the reported capital construction spending was spent in the United States, the remainder of the spending was reported in numerous other countries around the world in **Exhibit 16**. Outside of North America, Asia, including China and Russia, remains the area demonstrating the highest volume of spending for the responding owners, followed by Europe, South America and the Middle East.

More than half of the organizations responding at 55 percent start more than 26 projects annually in **Exhibit 17**. Seventeen percent of organizations start between 11 and 25 projects annually and the remaining 28 percent started 10 or fewer projects annually. These figures are down in comparison to 2008 where larger programs, both in number of projects and amount of spend, were reported. Overall, the results are much more similar to those reported in 2007.

The majority of federal agencies and publicly traded corporations tend to demonstrate programs with more than 50 project starts annually. Private/closely held companies described very large programs with more than 50 projects annually or a very small number of defined projects reporting 1-5 annually. State or provincial agencies and municipal authorities tended to report programs covering all sizes as measured by number of projects (**Exhibit 17**).

Exhibit 16 Worldwide Capital Construction Spending by Region

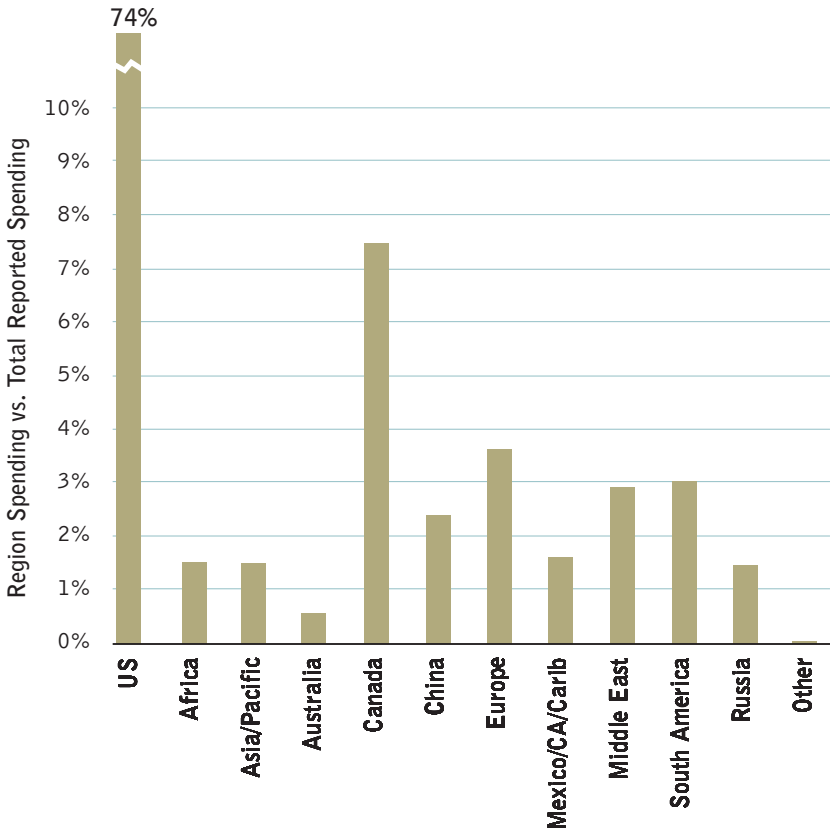
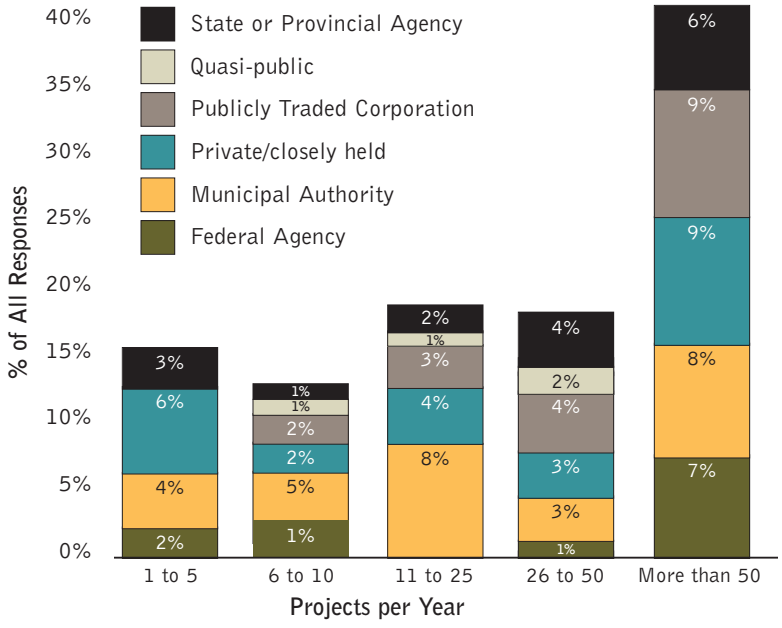


Exhibit 17 Number of Project Starts by Owner Type



CONCLUSION

The *Tenth Annual Survey of Owners* portrays an owner community striving to cope with changed economic conditions and new priorities in its building projects and programs. In general, owners are meeting this challenge by adopting a more comprehensive, strategic view of their activities and relying on service providers to support a wider range of functions than ever before.

Owners are outsourcing more work, and more kinds of work, and they expect this trend to continue. In particular, owners are seeking outside support for program activation and ongoing operations and maintenance activities, but the increase in outsourcing will embrace all phases, beginning in pre-design.

Early and proactive project leadership is also in increased demand. Owners expect their service providers to deliver effective strategies for avoiding claims and disputes, and to help them align their project delivery method with the project's characteristics. They also identify team coordination as an area of great and increasing need. In particular, owners need more commitment to collaboration from their architects and general contractors, whereas program managers and construction management service providers are seen as performing better in this regard.

A variety of services or functions viewed as relatively unimportant today will gain significantly in perceived importance by 2014. These emerging key areas reinforce the survey's overall finding that owners are seeking a more holistic approach to their construction. Among the largest "gainers" are factors related to ongoing maintenance and applications of new technologies to provide effective maintenance management.

The 2009 owners survey, taken as a whole, provides a snapshot of owners working to move from a tactical, project-driven approach to a strategy based on true life-cycle cost evaluation and asset management.

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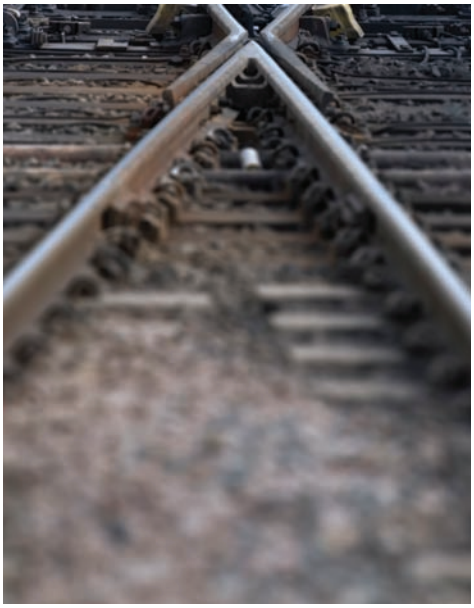

ABOUT FMI

Founded in 1953 by Dr. Emol A. Fails, FMI provides management consulting and investment banking for the worldwide construction industry.

FMI delivers innovative, customized solutions to facility owners; contractors; construction materials producers; manufacturers and suppliers of building materials and construction equipment; property managers and developers; engineers and architects; surety companies; and industry trade associations.

FMI's experienced professionals assist owners with the development of sourcing strategy, assessing design and construction unit performance and support for management skill development. Services provided to other construction industry businesses include strategic planning, leader and organizational development, business development, research, mergers and acquisitions, peer groups, private equity placement, project execution, and training.

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