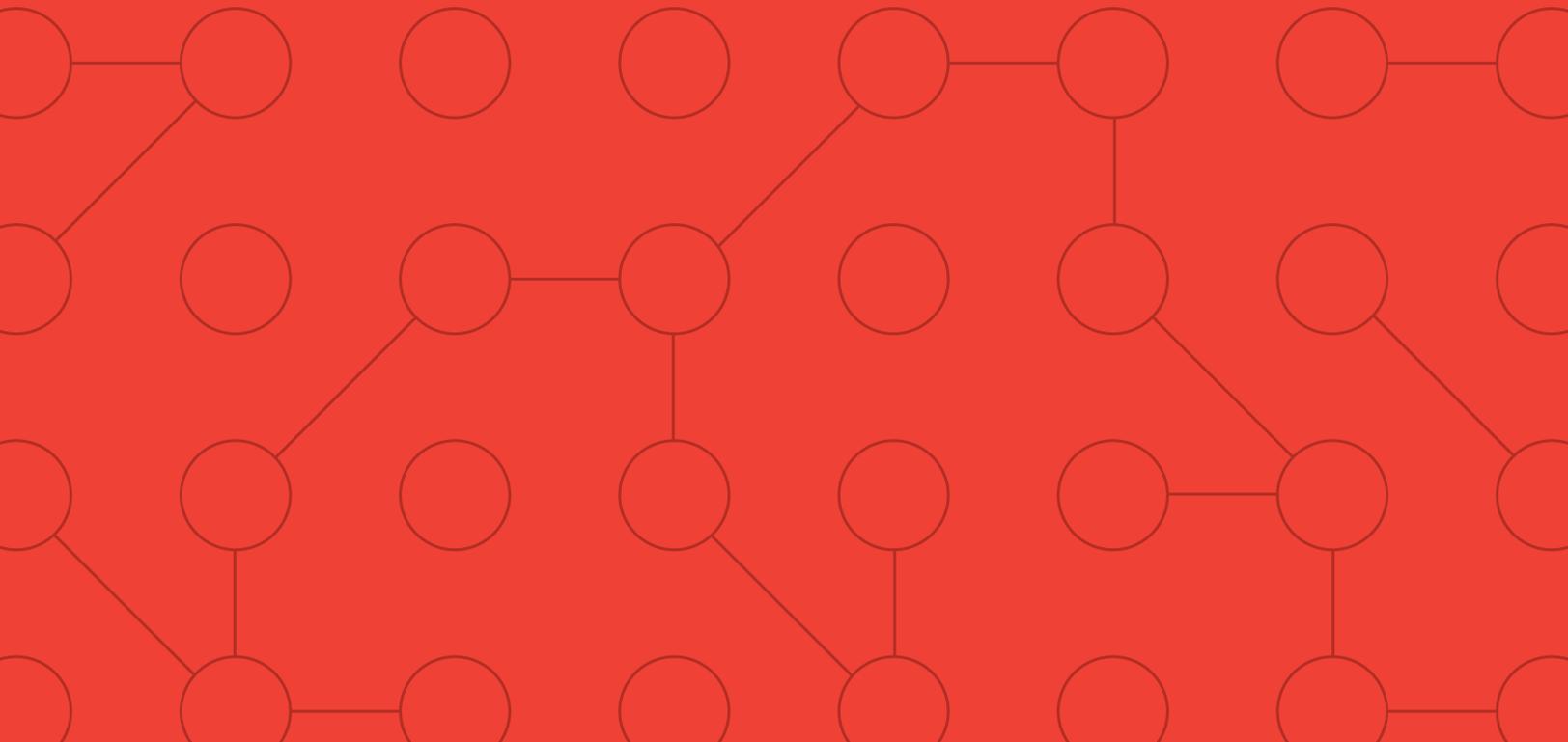




AIA Foresight Report

**The Changing Context,
Business, and Practice
of Architecture 2014**



INTRODUCTION

**A message from
Robert Ivy, FAIA
& Helene Combs Dreiling, FAIA**

Even for an era marked by an accelerating pace of change, we seem to be approaching an hour of profound transformation in the design and construction industries.

After six years of recession and tepid recovery, the economy at last seems poised for a significant rebound, with unemployment falling and stocks, construction activity, and demand all returning to pre-crisis levels. At the same time, long-developing trends such as urbanization, climate change, and income inequality are reaching a tipping point, and fostering a reawakening of—and renewed commitment to—fundamental values in our field. Those values are resiliency, sustainability, equity, and social conscience. New technologies, from 3D printing to mobile and cloud computing, are spurring innovation and transforming the way we work, create, and structure our firms. The needs of an increasingly diverse workforce are challenging traditional management and human resource models and bringing new voices to the table.

We at the AIA are deeply invested in the success of all of our 83,000 members. So at this time of great challenge and even greater opportunities, we are pleased to offer this comprehensive report on the changing context, business, and practice

of architecture in 2014. The report was compiled and assembled by Greenway Group and DesignIntelligence, and we want to thank them, and especially Jim Cramer, Hon. AIA, a former AIA CEO who intuitively understands the nuances and demands of our profession, for their hard work and superb analysis.

Comprised of both concise overviews and cutting-edge research about the major trends shaping our industry and our present, the Foresight Report is designed not as a one-size-fits-all roadmap but as a brief primer of useful knowledge for firms of all shapes and sizes to evaluate their own trajectories, experiment with change, and determine their own best path forward to grow, innovate, and flourish.

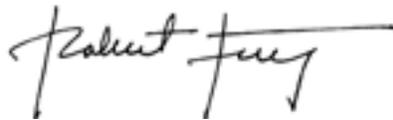
No one can predict the future, but we can increase our chances of success through research and preparation. The AIA Foresight Report can help in allowing you to evaluate both the trends that got us to this point and those that are at work in the moment. We hope you find it useful! We will continue doing all we can to help your firms—and the practice and art of architecture as a whole—prosper in these exciting times.

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Helene Combs Dreiling, FAIA
President



Robert Ivy, FAIA
EVP/Chief Executive Officer

EXECUTIVE SUMMARY

Operating environment

Cautious optimism in the U.S.

With a deficit that is shrinking back toward 40-year historical norms and lower unemployment, the general economic outlook for the U.S. seems to be continued but slow recovery.

Sources like the AIA Architecture Billings Index (ABI), ENR Construction Industry Confidence Index and Reed Construction Data indicate modest growth and cautious optimism for the near-term future.

Global: Slow recovery

The OECD (Organisation for Economic Co-operation and Development) and others predict that moderate growth in the global economy will be driven by recovery in the advanced economies.

Increased global flows and real estate investment

Flows of goods, services, and finance are 1.5 times the level of 1990 and today one in three goods are traded between nations and more than one-third of financial investments are international transactions. McKinsey predicts that in 10 years global flows could triple, powered by rising prosperity in the emerging world and by the spread of the Internet and digital technologies.

Global investment in real estate, according to Knight Frank, is also expected to rise 11 percent in 2014-2015.

Firm Strategies: the Business of Architecture

Marketing

Consumers are expecting more in an age of on-demand marketing in many sectors, including healthcare. Firms are evolving their value propositions, service offerings and communication platforms to achieve greater relevance.

Operations

Key trends involve all dimensions of staffing: attracting, motivating and retaining talent. Talent shortages driven by demographics and the Great Recession are colliding with greater worker mobility and a history of flat compensation rates.

Organization leaders grapple with winning new opportunities and keeping optimum levels of staff, as well as changes in health-care and issues of equity in the workplace.

Finance

Merger and acquisition activity, which increased during the Great Recession, is expected to continue.

Public-private partnerships (P3's) are growing in the U.S. as a project delivery method as both the federal government and several states change policies and regulations.

Model innovation

Small and mid-sized firms are taking advantage of technology to innovate value propositions, staffing, and communications.

Professional Practice

Technology driving practice

Advancements in social, mobile and cloud technology continue to bring change to all stages of the design and delivery process.

Wearable technology, embedded technology (Internet of Things), and advanced robotics promise to change not only the process but also the requirements of design.

Mimicking and using nature

New materials that mimic natural properties as well as the use of biological elements in structures promise greener, self-healing buildings and other advancements.

Rise of the crowd

Crowdfunding and crowdsourcing signal major changes in the role of users and clients in the design process.

Design thinking

The wider community of businesses and other organizations continue to adopt design-driven methodologies for solving problems, as evidenced by business literature and the growth of “design thinking” programs in non-design graduate schools.

Design with Purpose

Social innovation

Initiatives like Project M and the Dell Social Innovation Challenge (DSIC) are pushing for innovation in the ways that design and business integrate with society.

Health

AIA and the acting Surgeon General emphasize that all architecture presents an opportunity to positively influence public health.

Environment

New achievements in building performance such as the Bullitt Center in Seattle raise standards in lowering environmental impact and promoting healthy lifestyles.

The Ellen MacArthur Foundation inspires innovation by promoting a circular economy in which waste becomes the raw material for future production.

Continued advancements in resilient design, DfD (design for demolition), and construction methods help minimize and mitigate hazards.

OPERATING ENVIRONMENT

Flux and change in an
interconnected world

**Driven by mega-trends
such as technology and
demographics, shifts in
the social, economic and
environmental context are
shaping the business and
practice of architecture and
design for firms of all sizes.**

Trends shaping trends: the global perspective

Richard Saul Wurman, founder of the TED conferences and author of 83 books, said that “understanding is a path, not a point. It’s a path of connections between thought and thought; patterns over patterns.”

Like understanding, trends can be a complex array of forces that cause or shape one another. Trends define the operating environment for businesses of all types and sizes, from the largest client to the solo architect.

International financial consultancy PwC lists five key mega-trends: demographic

shifts, shifts in global economic power, accelerating urbanization, resource scarcity and climate change, and technological breakthroughs.

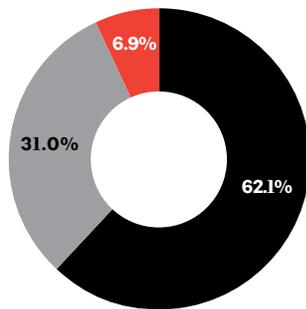
Of the five mega-trends, all will have a direct effect on requirements for the built environment. Greater numbers of people will need places to live, work and play. Increasingly, those places will be in urban environments (and in other parts of the world). Resource scarcity and climate change will require that we create buildings and environments that are resilient and minimize impact on the planet’s natural resources. And those who create and shape the built environment will be at the center.

“We are called to be architects of the future, not its victims.”

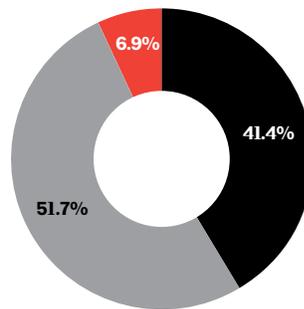
R. Buckminster Fuller, FAIA

Cautious optimism

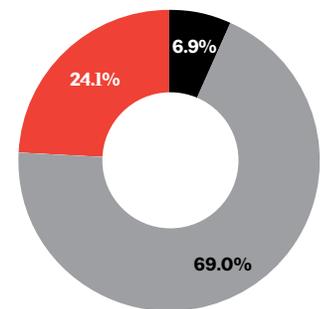
Recent surveys in DesignIntelligence indicate a growing optimism among design firm leaders. When asked whether they foresee bullish, neutral, or bearish growth for 2014–2015, respondents have a positive outlook for many areas of the world.



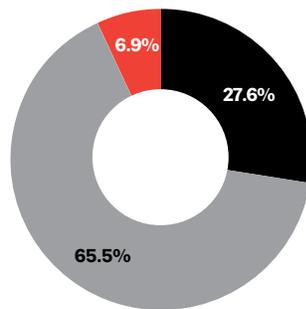
ASIA



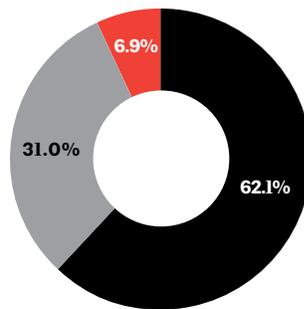
CANADA



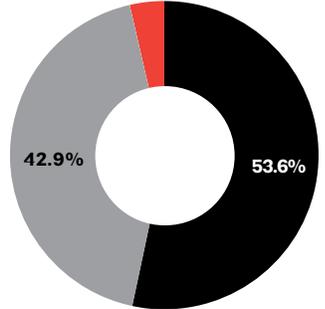
EUROPE



MIDDLE EAST



SOUTH AMERICA



UNITED STATES



UNITED STATES OVERVIEW

After a deep recession and a sluggish recovery, the U.S. economy is experiencing the turbulence of a turnaround. Good news one day is met with bad news the next. Nevertheless, overall trends point to continuing improvement. The AEC industry is expected to be swept up in the growing economy.

Declining deficit

Congressional Budget Office (CBO) reports that the federal budget deficit has fallen sharply during the past few years and could dip further in 2014 and 2015. The CBO also estimates that under current law, the deficit will total \$514 billion in FY2014, compared with \$1.4 trillion in 2009: “at that level, this year’s deficit would equal 3.0 percent of...gross domestic product (GDP)—close to the average percentage of GDP seen during the past 40 years.” Though an

aging population, rising healthcare costs, and expansion of federal subsidies could reverse the trend between 2015 and 2024.

Employment numbers improving...or not?

According to the **Bureau of Labor Statistics**, unemployment numbers have dropped from 9.8 percent in November 2009 to 6.3 percent in April 2014. The recent good news, however, belies potentially deeper troubles in the labor market. Labor force participation has dropped from 66 percent just before the recession to about 63 percent today. These small percentage points represent millions of workers leaving the labor force and millions of younger workers not entering or being shut out of the labor force.

Construction activity looking up

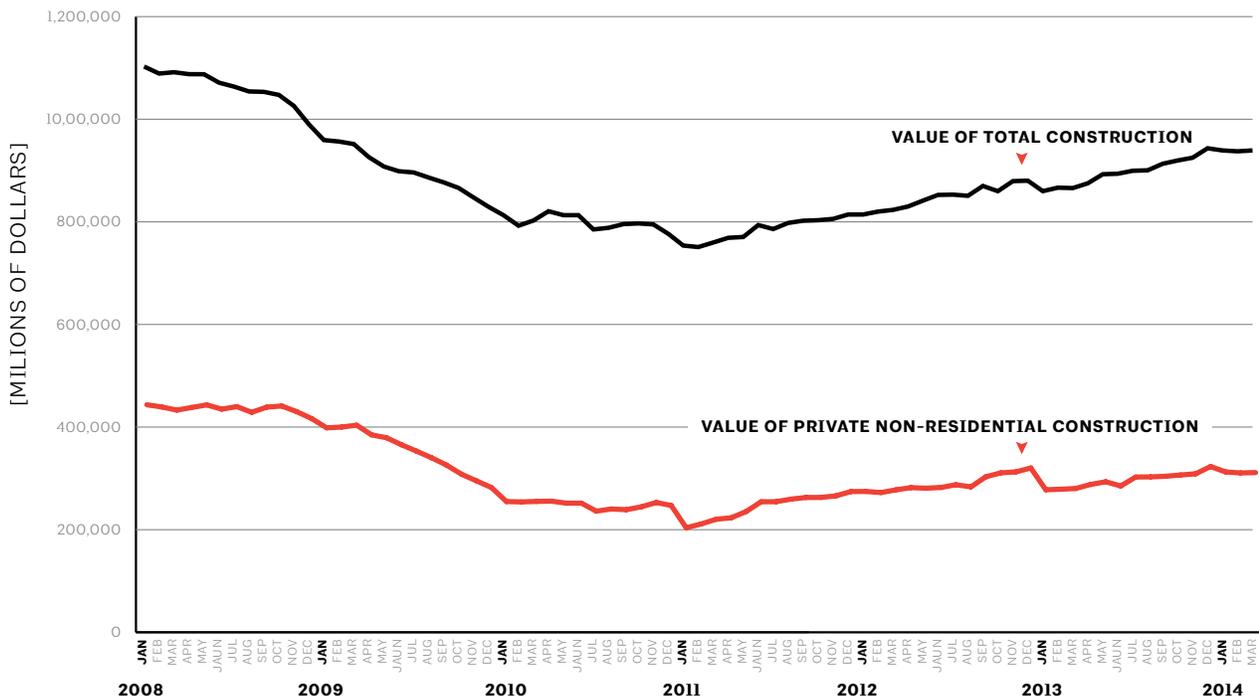
Bernard Markstein, U.S. chief economist

for **Reed Construction Data**, believes the economy is on an upward trajectory: “The combination of a growing economy and low long-term interest rates will spur an increase in nonresidential building construction starts, exceeding last year’s starts numbers and, as a result, construction activity.”

The **ENR Construction Industry Confidence Index** survey, which included responses from 414 executives of large construction and design firms, for the first quarter of 2014 shows that the vast majority of construction and design firm executives believe the market is stable or growing. The index stood at a record 72 on a scale of 100, which is an indicator of a growth market and represents a three point gain from the previous quarter.

SEASONALLY ADJUSTED CONSTRUCTION SPENDING 2008-2013

SOURCE: U.S. CENSUS BUREAU



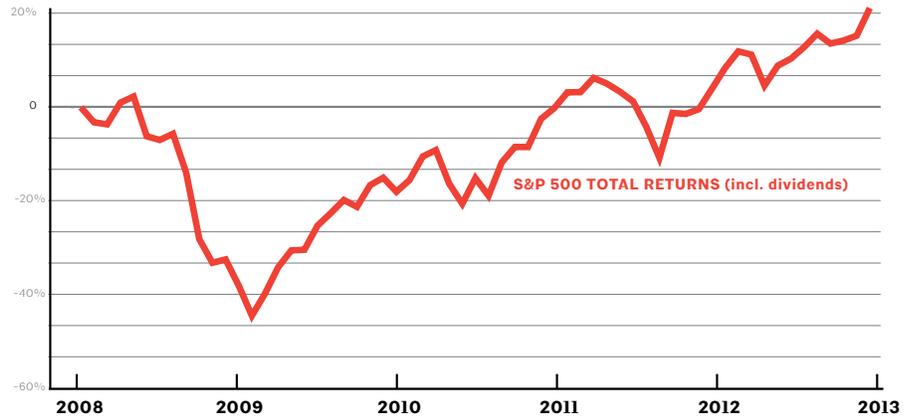
U.S. ECONOMY

TOP 10 INDUSTRIES BY ANNUAL AVERAGE EMPLOYMENT GROWTH 2Q09-2Q13

1. Other Information Services (Average annual growth rate 7.0%)
2. Support Activities for Mining (6.0%)
3. Educational Support Services (5.7%)
4. Technical and Trade Schools (4.1%)
5. Oil and Gas Extraction (4.0%)
6. Computer Systems Design & Related Services (3.5%)
7. Management & Technical Consulting Services (3.4%)
8. Other Schools and Instruction (3.2%)
9. Ambulatory Healthcare Services (2.9%)
10. Employment Services (3.0%)

SOURCES: BBVA RESEARCH, BLS AND CENSUS BUREAU

S&P 500 2008-2014



Both the Dow Jones Industrial Average and the S&P 500 have rebounded to pre-recession (1Q 2008) levels.

INFLATION

2013 yearly average - all urban consumers

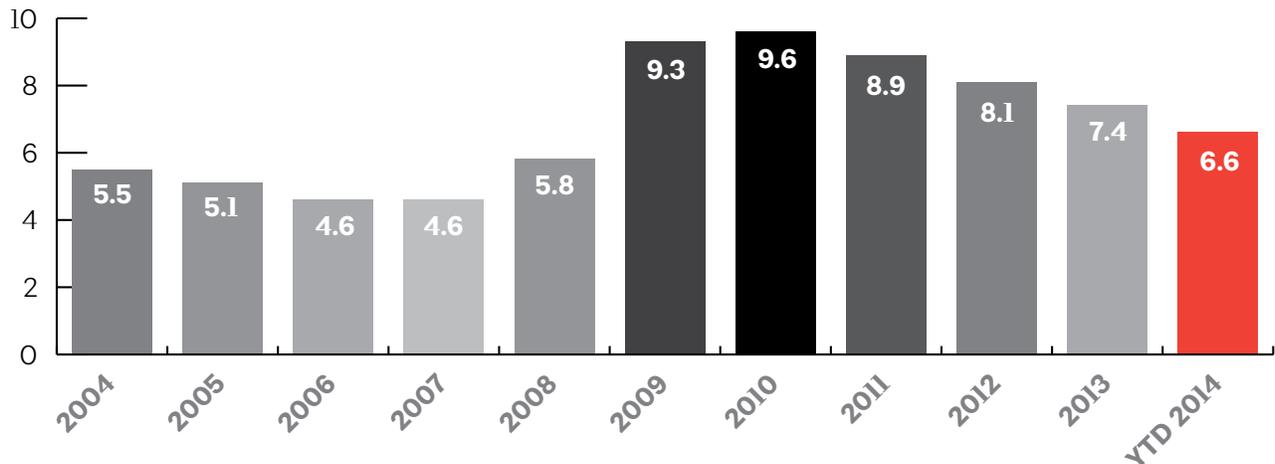
1.5%
(Based on Consumer Price Index)

U.S. GDP IN 2013

~\$16.8 Trillion
(Real growth of 1.9 percent over 2012)

UNEMPLOYMENT RATE, YEARLY AVERAGES 2004 - YTD APRIL 2014

Source: Bureau of Labor Statistics



GLOBAL OVERVIEW

The worldwide operating environment for architecture and design

OECD outlook

The Organisation for Economic Co-operation and Development (OECD) in the [World Economic Outlook report](#) expects global economic activity in the next two years to build on the positive characteristics of Q3 and Q4 of 2013. The OECD projects that overall growth for 2014-2015 will be 3.7 and 3.9 percent, respectively, driven by the recovery in the advanced economies.

Global Flows: goods, services and finance

9 According to the [McKinsey Global Institute \(MGI\)](#), flows of goods, services, and finance reached \$26 trillion in 2012, or 36 percent of global GDP, 1.5 times the level in 1990. Today one in three goods are traded between nations and more than one-third of financial investments are international transactions.

McKinsey predicts that in 10 years global flows could triple, powered by rising prosperity in the emerging world and by the spread of the Internet and digital technologies. MGI scenarios predict global

flows could reach \$54 trillion to \$85 trillion by 2025, more than double or triple their current scale.

The report lists three ways that digital technologies, which reduce the cost of production and distribution, are transforming flows in three ways: “through the creation of purely digital goods and services, ‘digital wrappers’ that enhance the value of physical flows, and digital platforms that facilitate cross-border production and exchange.”

Global executives see improvement

In a [separate McKinsey survey](#), business leaders said that they also anticipate that conditions will continue to improve, thanks to steady (though modest) improvements in the developed world.

Worldwide real estate

Global property company [Knight Frank](#), citing analysts [Real Capital Analytics \(RCA\)](#), said that global investment in commercial property rose 17% to \$533 billion in 2013. Knight Frank is forecasting increases of 11% in 2014 and in 2015, or \$593 billion and \$657 billion respectively.

Resources for global practice

The United States Commercial Service maintains a [Global Design & Construction Team](#) to help U.S.-based firms of all sizes develop opportunities to practice abroad.

The Global Design and Construction Team is made up of domestic and international trade specialists with the U.S. Department of Commerce/International Trade Administration that specializes in AEC and related industries:

- Architecture, engineering and construction services
- Building products
- Construction equipment
- Greenbuild & sustainable development
- Interior design

The Commercial Service provides firms market specific information about projects, finding partners, and conducting due diligence in foreign markets.

AIA is a core supporter of the Global Design & Construction Team and has sponsored two architecture trade missions to E7 Countries in the past two years

For more information export.gov/industry/architecture

GDP OF G7 AND E7 COUNTRIES AT \$PPP*

SOURCE: PWC ANALYSTS

G7

U.S., Japan, Germany, U.K., France, Italy, Canada

E7

China, India, Brazil, Russia, Indonesia, Mexico, Turkey

2009

US\$29.0 trillion GDP



G7

US\$20.9 trillion GDP



E7

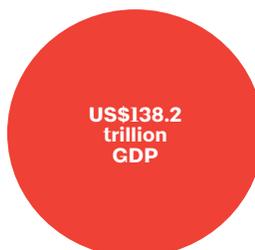
2050

US\$69.3 trillion GDP



G7

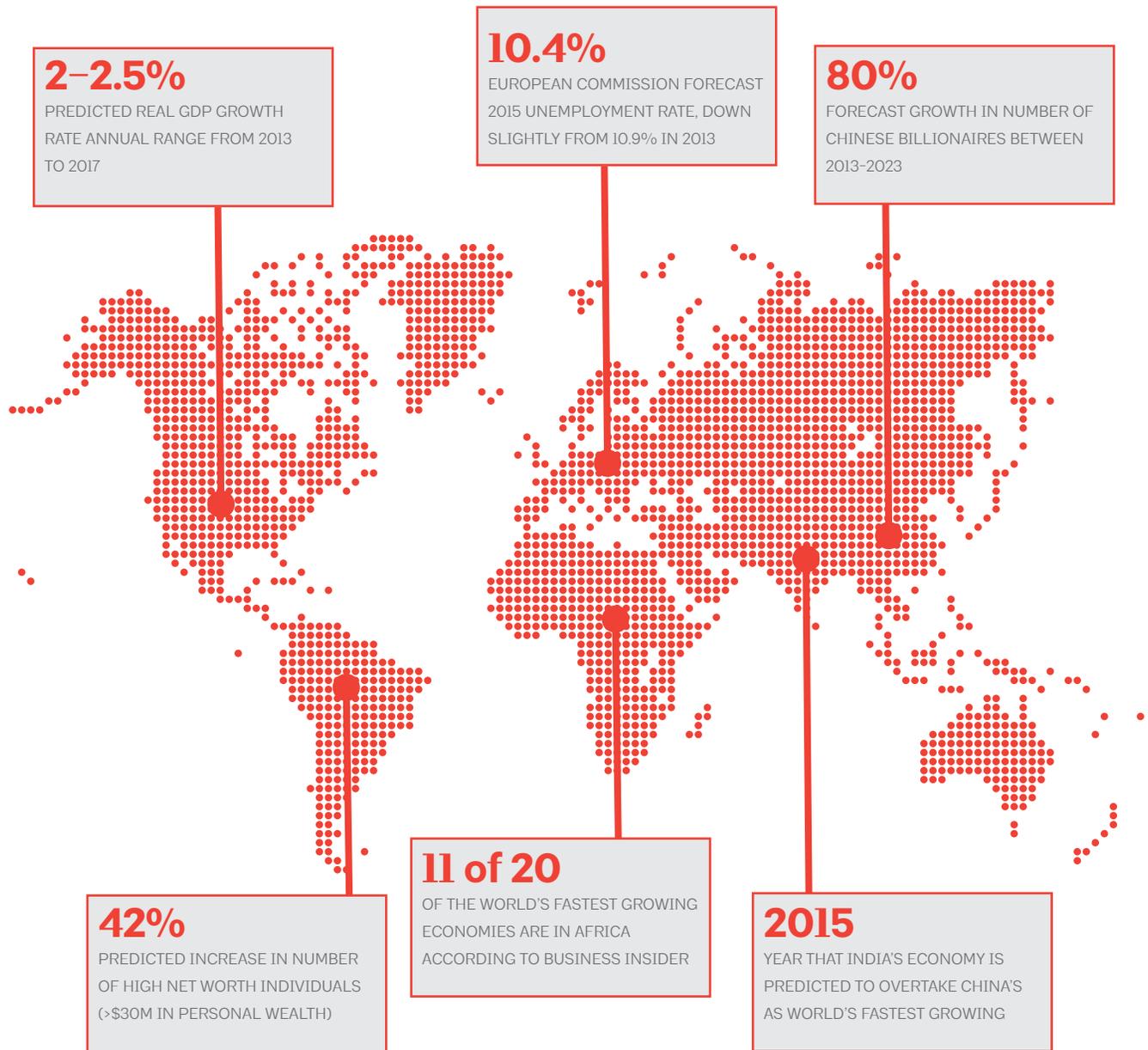
US\$138.2 trillion GDP



E7

*PURCHASING POWER PARITY

GLOBAL HIGHLIGHTS



8.3 billion
world population forecast by 2030

\$54 - 85 trillion
global flows of goods, services and investments by 2025

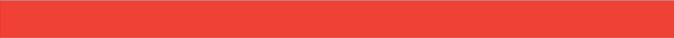
1.84
connected devices per person 2010
(12.5 billion)

6.58
connected devices per person 2020
(50 billion)

Global needs in 2030
50 percent more energy
40 percent more water
35 percent more food

FIRM STRATEGIES

The Business of Architecture



As the business environment improves, firms evolve traditional models and methods to find new ways of creating relevance, impact and opportunity.

The new world of marketing

As the economy improves and firms find more opportunity, they may still have to contend with clients who are used to paying Great Recession fees.

Technology is changing consumer expectations of access to information and options, putting pressure on businesses of all types to find new ways of communicating and delivering value.

On-demand marketing + integration of physical and virtual environment

Whether it's being able to design a custom shoe on a website or interact with brands via social media, consumers have more choice and voice than in prior generations. Technology has also enabled marketers to more finely target and personalize their contact with customers.

McKinsey predicts that by 2020 the consumer experience will likely be radically integrated across the physical and virtual environment, stating that most of the technologies needed to make this happen are available now.

If this trend continues, buildings and spaces could become a more deeply integrated part of the "decision journey" to a purchase. Built environment designers may need to partner with new team members like marketing and see their own work in a different light.

Consumer-driven healthcare spaces

Alicia Wachtel, Vice President and Healthcare Regional Leader at HOK, said in *HealthCare Design*: "Consumer-driven growth in healthcare services is capitalizing on patient preference by making care accessible in non-traditional environments." Examples include housing clinics in retail

environments, such as mammogram screenings that have been made available in some Nordstrom locations.

Evolving value propositions

As firms face competitive environments and changing expectations in the marketplace, some have found innovative ways of structuring stronger value propositions.

FastCompany's 50 Most Innovative Companies listed only one architecture practice: New York-based *SHoP Architects*.

They were lauded for successfully marrying great design and good business practices: "rethinking the very notion of how architecture should be practiced, experimenting with everything from how architects get paid to how the firm participates in the treacherous worlds of politics and construction." From trading fees for equity

“Buyers of architecture and design will become smarter and more sophisticated consumers with ever increasing amounts of real-time information about services, abilities and prices. To compete effectively in this new open marketplace, firms with similar competencies will have to bid for work via semi-open auctions.”

Mike Seyle
CEO + President, WATG

“Architecture is measured against the past; you build in the present, and you try to imagine the future.”

Richard Rogers
Rogers Stirk Harbour + Partners

in projects to involvement in the politics behind creating developments, to bold experiments with modular construction, SHoP was commended for innovating on all fronts of its practice.

Other firms have changed their model even more radically. The Washingtonian describes Bethesda, MD-based firm [Streetsense](#) as a “one-stop shop for entrepreneurs and developers who have an ambitious idea and need a range of expertise to make the dream a reality.” They combine disciplines that span the traditional divide between different types of firms and perhaps clients: architecture, interior design, branding and marketing, brokerage and real estate strategy, development, research, analysis, planning, and food and beverage consulting.

Media and communications channels

Firms are fully engaged in an ever-broadening mix of communication media and channels in building marketing platforms beyond the traditional white papers and brochures. Individual architects are embracing new media to ensure that their voices are part of the conversation

Texas-based residential architect Bob Borson, AIA is one example. Begun as a creative outlet during a 2010 slow period, Bob’s “[Life of an Architect](#)” blog receives more than 3 million unique visits per year.

Other blogs include [BLDG|BLOG](#) by Geoff Manaugh, [BUILD Blog](#) by architecture firm Build, and [Coffee with an Architect](#) by Jody Brown, AIA. Podcasts such as [ArchiSpeak](#) by Evan Troxel, Neal Pann, and Cormac Phalen as well as [ArchiTalk](#) by Sebastian Eilert, AIA and Jane Decker, AIA have created platforms for individual practitioners to share their viewpoints and open a door for a wider audience into the practice of architecture.

Evolving needs and opportunities in residential design

The residential design sector continues to gain strength. According to the [AIA Home Design Trend Survey Q3 2013 report](#), the business recovery for residential architects has been strong since early 2012. The report showed a national billings score of 63.0 for the quarter, the third in a row that was over 60.0 (a score above 50.0 indicates that billings are growing in the aggregate).

More micro

Though there are some indications that larger homes are growing in demand, there is also evidence that interest in micro homes continues as well.

Since last year’s report, the [Seattle Department of Planning and Housing](#) has announced that the city will review whether to allow micro housing in its jurisdiction.

Even famous architects are offering their ideas. In 2013, Renzo Piano, Hon. FAIA, designed [Diogene](#), a 7.5 sq m (81 sq ft) micro home that is equipped with a foldaway desk, chair, sofa bed, composting toilet, shower plate and a small kitchen unit with built-in sink and refrigerator.

In 2014 the Savannah College of Art &

Design (SCAD) launched an initiative called **SCADpad** in which 75 students, 37 alumni and 12 professors from 12 academic degree programs collaborated to fill part of a parking garage with micro housing units that are each the size of one parking space.

Re-urbanization

Much has been written about empty nest baby boomers and Millennial emerging professionals moving into the cities for the amenities and cultural resources an urban area can provide.

According to the **most recent census**, urban areas now account for 80.7 percent of the U.S. population, up from 79.0 percent in 2000.

But will re-urbanization continue? Tim Wang, director of research for Clarion Partners, the New York-based real estate investment firm, **recently expressed skepticism** in a grocery retail trade publication: "I can't say if re-urbanization is a long term trend. As a strategist, I'm looking 10 years down the road. When the echo boomers have families and need more space and better schools, will they move back to the suburbs? I don't know."

Google goes home

In January 2014, Google announced it would buy smart home product developer **Nest** for \$3.2 billion in cash, signaling the tech giant's interest in the future of connected homes. Nest makes the Learning Thermostat and the Protect smoke and carbon monoxide detector.

Operations

How firms structure themselves in terms of systems, settings, procedures and people can be a critical factor in their success. Key trends, especially in human resources, may

be a driving factor in how effective architecture and design organizations can be.

Talent availability, mobility and retention

While experts like Edward Lazear, former chief economist for George W. Bush, **disagree that a skills mismatch** is responsible for current high unemployment, much has been written about future skilled labor shortages in the manufacturing and construction industry.

Writing in *Fortune*, **Anne Fisher characterized the magnitude of the issue** this way: "companies that make tangible products are struggling to find candidates for about 237,000 job openings. To put that figure in perspective, it's 89,000 more than the entire U.S. economy created in September (2013)."

As early as 2012, **surveys by McGraw-Hill** predicted significant talent shortages beginning in 2014. Moreover, the **Bureau of Labor Statistics anticipates** approximately 18,600 architecture jobs will be added to the U.S. economy between 2012 and 2022, which represents a greater-than-average growth rate of 17 percent.

A growing backlog for firms means new opportunities for individual practitioners. According to the **AIA's 2013 Compensation Report**, voluntary turnover rates at firms increased from 4.5 to 5.6 percent in firms of all sizes from 2010 to 2012. Turnover was greatest in the largest organizations, reaching nearly 10 percent in firms of 250 or more, compared to 5 percent at firms with fewer than 19 employees.

Engagement

Kevin Kruse, author of *Employee Engagement for Everyone: 4 Keys to Happiness and Fulfillment at Work*, defined

COST OF ACTIVELY DISENGAGED WORKERS
\$450-550
BILLION PER YEAR
SOURCE: GALLUP

The firm of the future...

...is constantly evolving and will be one that is seen as innovative and visionary where that vision creates a competitive edge.

- 15 The firm of the future will also leverage technology in creating and communicating design, and it will be truly committed to sustainability which will become a mainstream requirement.

**Owen Leslie, AIA
President, Acquilano Leslie**

engagement in a [Forbes article](#): “Employee engagement is the emotional commitment the employee has to the organization and its goals.”

Engagement relates to key measures like productivity and turnover, which have significant financial effects on organizations.

According to [Gallup’s “State of the American Workplace” report](#), 30% of the U.S. workforce is engaged and “the ratio of engaged to actively disengaged employees is roughly 2-to-1, meaning that the vast majority of U.S. workers (70%) are not reaching their full potential.”

The report also showed that organizations with an average of 9.3 engaged employees for every actively disengaged employee in 2010-2011 experienced 147% higher earnings per share (EPS) compared with their competition in 2011-2012.

Gallup also found that “managers who focus on their employees’ strengths can practically eliminate active disengagement and double the average of U.S. workers who are engaged nationwide.”

Integration with education

As part of the ongoing effort to attract top talent, some firms are developing closer relationships with schools of architecture and design. Baltimore-based [Hord Coplan Macht](#), for example, actively seeks and maintains relationships with programs that are culturally compatible and prep graduates with the right skills. The firm has an ongoing program for both high school and college interns.

For president Chris Schein, the benefit of working with entry level practitioners goes both ways: “Interns bring youthful energy and are naturally inquisitive. They ask great

questions that cause us to reflect about how we work and think about design.”

Compensation trends

Data from both the [AIA 2013 Compensation Report](#) and the [DesignIntelligence Compensation, Bonus & Benefit Survey](#) show that despite recent improvements in the business environment for firms, compensation has remained relatively flat at most levels.

As employees have more opportunity to consider positions at other firms, talent shortages become more apparent, and pay levels remain flat, these staffing and compensation trends seem to be on a collision course.

Some firms are exploring alternative ways to attract and retain key talent, including flexible work plans (hours and location) that allow for better work/life balance, improved work environments, profit sharing programs, fringe benefits, and ongoing education.

Healthcare reform

William G. Gale, writing in an [opinion piece for the Brookings Institution](#), articulated the impact of healthcare-related expenses on the economy: “Rapidly growing health-care costs have been a major driver of actual and projected federal budget deficits and the national debt. In recent years, the rate of growth in medical spending has slowed, leading many to ask whether a permanent decline could solve the nation’s long-term fiscal problem.”

The Congressional Budget Office (CBO) in a published report titled [Budget and Economic Outlook 2014-2024](#), estimates that “the ACA (Affordable Care Act) will reduce the total number of hours worked, on net, by about 1.5 percent to 2.0 percent during the period from 2017 to 2024,

almost entirely because workers will choose to supply less labor—given the new taxes and other incentives they will face and the financial benefits some will receive.”

The Affordable Care Act is a combination of new regulations, fee structures, and taxes that are likely to have a significant impact on firms as components of the law are further defined.

According to Bill Fanning, Director of Research for the Professional Services Management Journal (PSMJ), owners and managers of firms larger than 50 FTE equivalents must be cautious to ensure they follow the many provisions of the law. Such provisions include ensuring that all part-time employees and interns are accounted for in staff tallies and that employees pay less than 9.5 percent of their household income through withholdings.

Missing 32 percent

The U.S. Census reports that 50.8 percent of the population in the United States is female. However, the percentage of the 105,847 registered architects (NCARB) in the United States is considerably lower. AIA data from May 2011 indicates that among their members only 15 percent were licensed female architects, 30 percent female associates; moreover, women accounted for 17 percent of firm principals and partners.

The Missing 32%, which draws its name from the gap between the percentage of female architecture students and licensed female architects, grew from a 2011 event of the AIA San Francisco Communications Committee.

The group has conducted well-attended symposiums each year since 2012 in order to further their mission of promoting “the

strategic execution of best practices in the recruitment, retention, and promotion of our profession’s best talent in order to expand diversity and inclusion at every level in architectural practice.”

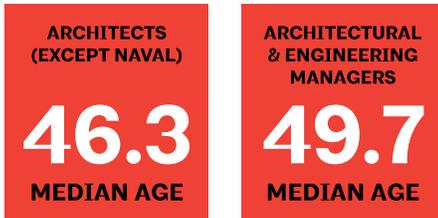
In February 2014, the Missing 32 Percent launched an “Equity in Architecture” survey intended to provide additional data and insight on issues of equal opportunity in the architecture profession.

Last fall AIA Women’s Leadership Summit Committee conducted the third in a series of events started by the Boston Women Principals Group in 2009 and followed by Kansas City in 2011. The AIA Women’s Leadership Summit 2013 gathered voices of Architects serving in various leadership roles, including, principals, educators, owners, designers, environmentalists and innovators. The attendees were inspired by the words of Billie Tsien, AIA, who shared her perspective on the Phoenix Art Museum. The next AIA

“Architects are doing more—providing BIM models, building analysis, and programming—for the same fee basis as ten or twenty years ago, which was before the architectural technology infusion. Our fee for service ratio has not kept up with the level of services we provide.”

Emily Grandstaff-Rice, AIA
Associate with C7A and president of the Boston Society of Architects

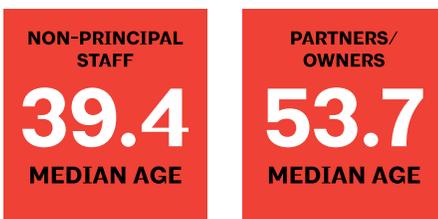
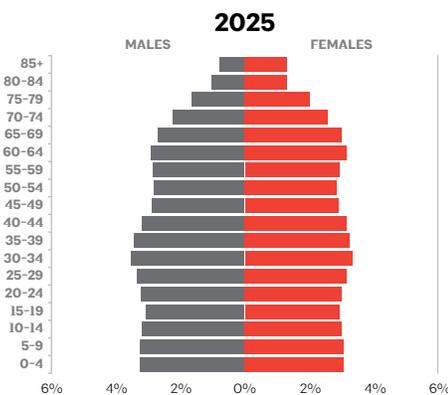
Source: Bureau of Labor Statistics



Pew's Population Pyramid

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According to Pew Research, a chart of age groups in any society in history would look like a pyramid, with the youngest members making up a wide base. But from 1960 to 2060, the “pyramid will turn into a rectangle.” This unprecedented demographic shift will present challenges as a proportionally smaller cohort of working adults will support those too young or old to participate in the workforce.



Source: DesignIntelligence

Women's Leadership Summit Committee event is in the planning stages for the **fall of 2015 in Seattle.**

Architecture Diversity and Inclusion

According to Kathy Dixon, AIA, president of **NOMA (National Organization of Minority Architects)**, the percentage of registered African-American female architects is trending upward. “The architectural industry has become more diverse in the past couple decades but has a great distance to go before arriving at the level of other professions with regard to numbers of practicing minorities,” she said.

“Although AIA members that identify as African American have been slowing in recent years, overall the numbers have increased by 20% since 2006. Those who identify within minority categories as a whole have grown by 23% in the same time period”, says Damon Leverett, AIA managing director of diversity and emerging professionals at AIA national.

“One of the largest planned projects at the AIA for 2014 is the AIA Diversity in Architecture Survey. The new survey has two main objectives. First and foremost the new diversity scan seeks to create a stable data set that will allow for periodic assessments and improved trend analysis. Secondly the survey will, among other objectives, look deeper into what paths to becoming an architect they pursued, how firm culture affects their career objectives and what type of practices minority architects are working in.”

Finance

M&A trend update

KPMG predicts the overall environment for merger and acquisition (M&A) will continue to improve in 2014 due to large cash reserves, readily available financing and

increased CEO confidence in businesses.

In a recent AIA Work-on-the-Boards survey, more than half of respondents felt that M&A activity among architecture firms would increase and nearly 40 percent indicated that it would remain at its current level.

Almost 60 percent of respondents felt that for the coming year the most common type of activity would be mergers or acquisitions between architecture firms, while nearly equal numbers of respondents (approximately 19 percent) thought architecture firms merging with or acquiring other non-architecture firms or non-architecture firms merging with or acquiring architecture firms would be the most common scenario.

While 74 percent of respondents in the AIA study cited adding new markets (domestically or internationally) as a very important reason for firms to engage in M&A activity, other drivers may be a factor. The **Birmingham Business Journal** reported that a 2013 spike in sales of businesses due to the retirement of baby boomer owners was expected to increase in 2014 and beyond.

Evolving profile of risk

While many think of risk as limited to technical issues, Randy Lewis of the **Design Professional unit of XL Group** encourages firms to understand contributing business and process factors such as negotiations and contracts, client selection, project team selection as well as open and clear communication.

For example, firms that spend more than 6 months integrating staff in order to build stronger project teams and communication have a lower risk profile: a 4% expenditure on training as percentage of net revenue is highly correlated (90th percentile) with a reduced risk profile.

Lewis also encourages firms to monitor key trends, especially the shift of generations, blurring of lines between traditionally separate roles and stages in the design and delivery process, changes in firm talent profiles, and shifts driven by BIM and other technologies.

P3 update

Though not yet as common as they are in other countries, public-private partnerships (P3's) are gaining traction in the U.S. More and more, state legislatures are codifying P3 as a new and comprehensive project delivery method for vertical infrastructure. Cues have been taken from other countries as well as experiences in the US with horizontal P3's. After the Great Recession, public entities are looking to the private sector for financing options. So far, in addition to some federal agencies (GSA, VA, and DOD) moving toward P3 as a project delivery method, certain states (VA, TX, MD, FL, NC and the territory of PR) have fully codified its use. Many other states are

actively seeking passage of new laws that would comprehensively authorize P3 for public buildings, such as PA, NY, HI, OR, TN, GA, and the District of Columbia. Other states have limited authority on the law books already; for example, NJ authorizes P3 for certain higher educational facilities.

According to Yvonne Castillo, Esquire and Director of State & Local Government Relations at the Institute in Washington, DC, this emerging trend in project delivery “warrants the keen attention of architectural firms across the country because it has the potential to shift dramatically the paradigm in which the profession delivers design services.” Depending on the policies and regulations that evolve to govern this new delivery method, Castillo states that “architectural firms may no longer be positioned to provide design services directly to the end user of the building, but instead will be contractually obligated to a contractor or financier”

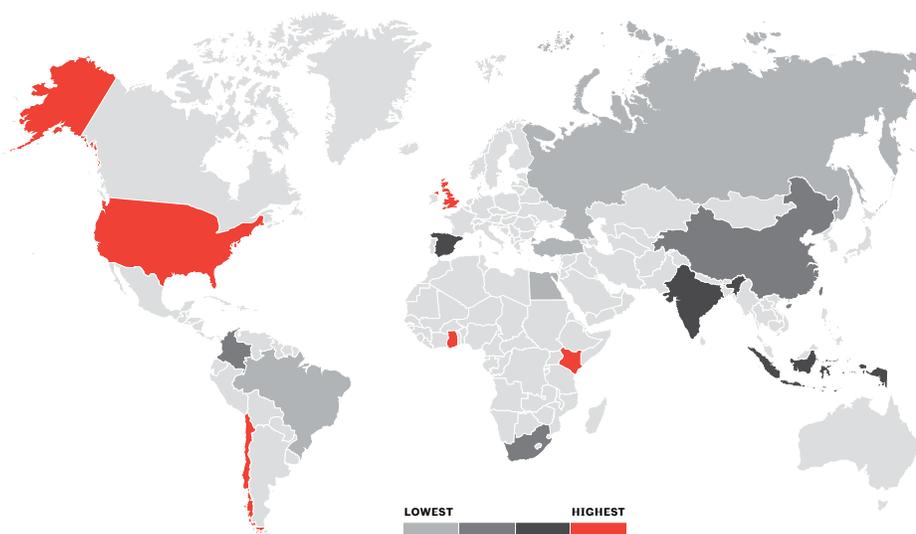
CONCORDIA INDEX

SOURCE: CONCORDIA

The Concordia Index, developed by the nonprofit that convenes the Concordia Summits, measures the readiness and need of a country to engage in public-private partnerships (P3s) for positive social and economic impact.

The Index consists of 40 indicators that are organized into three domains:

1. Political climate
2. Investment climate
3. Infrastructure gaps



“New cloud-based tools are making the world a much smaller place. Today, my team can be located anywhere in the world. I believe the networked virtual firm is the future of small firm architecture.”

Mark R. LePage, AIA

19 Co-founder, Fivecat Studio and founder, Entrepreneur Architect

Every scale of firm comes with advantages and disadvantages regarding innovation. Larger firms tend to have the resources to conduct research and develop innovative design practices and methodologies. Smaller firms, by contrast, tend to be more nimble in making changes to their organizations.

Consequently, much of the innovation in entrepreneurship and business models for architecture and design are coming from small and mid-sized firms. And in many cases, practitioners are helping one another build stronger businesses so that they can focus on what's important: doing great work, having a balanced life, and being appropriately rewarded for the value they bring.

Fostering entrepreneurship

Like many professions, architecture and design requires rigorous training that leaves little time for learning to start and run businesses. Consequently, practitioners at all levels are left to learn the business of architecture and design once they enter the marketplace.

There is a grassroots movement among solo practitioners and small firms to help one another with the business side of what they do.

Peer to peer: new tools

Web, social and mobile communication tools, as well as a growing supply of software options, have enabled solo and small firm practitioners to communicate more broadly and offer resources to their peers. Entrepreneurial practitioners are taking advantage of blogs, podcasts, and social media networks in order to provide knowledge, resources, and community for fellow small-firm architects and designers.

Peer to peer: business resources

Enoch Sears, AIA, established the [Business of Architecture](#) blog and podcast in order to provide “Business 101 for architects that isn’t offered in school.” In addition to download-able resources, he produces a biweekly interview podcast that features small firm practitioners and business consultants from around the world.

Mark R. LePage, AIA, uses his experience as the co-founder of a small residential firm to inform his multi-platform outreach “Entrepreneur Architect.” [Entrearchitect.com](#) includes blog posts and podcast episodes as well as free and for purchase resources.

Jes Stafford, AIA, who runs North Carolina-based [Modus Operandi Design](#), is the driving force behind a virtual community called [Big Time Small Firm](#). Stafford and others participate in regular Google hangouts—video discussions about the business of running a small practice.

Rewarding entrepreneurship: Architecture Business Plan Competition

Matt Ostanik, AIA, founded and led a construction software company, [Submittal Exchange](#), to address issues he faced as

a project architect. After growing and selling the business, Ostanik founded the Charrette Venture Group, which focuses on supporting entrepreneurs in architecture and design.

Ostanik's success as an entrepreneur led him to sponsor the **Architecture Business Plan Competition**, whose first event was held in 2014 for startup firms (in operation 0-5 years) in the U.S. and Canada.

New models

In the article "**How Wide is Your Triangle? Business Models for Design Firms**" Rena Klein, FAIA describes three basic models for firms of all sizes: efficiency, experience, and expertise. Each model varied based on the way the firm was staffed (proportion of junior to senior members) and the firm's core value proposition (from lower cost to specialized knowledge).

Solo professionals and small firms are finding even more ways to innovate their firm structures and value propositions.

The best of both worlds

Oscia Wilson, AIA, founded San Francisco-based **Boiled Architecture** in order to address the inefficiencies and stresses she experienced in traditionally structured practices. At Boiled Architecture she developed a model in which firm members

work remotely three days per week and at the same physical location the other two. The mixed physical and virtual model, made possible through communication and file sharing technology and an unconventional subleasing arrangement, allows the firm's six members to have the best of physical and virtual working environments.

Virtually successful

Mark R. LePage, AIA, and his wife Annmarie McCarthy co-founded **Fivecat Studio Architecture** in 1999 as a traditional firm in Westchester County, New York. After 11 years they vacated an expensive office space and moved to a virtual-based business model. Their strong regional brand in high-end residential practice, as well as use of technology, has allowed them to reduce monthly expenses 40 percent without triggering significant client concerns.

Network of independents

Kevin deFreitas, AIA, winner of the 2010 AIA Young Architect Award, operates his firm **KDA** as a network of independent professionals. Like Wilson and LePage, deFreitas makes extensive use of technology in order to facilitate his firm structure.

Unlike a virtual firm, members of a network of independents can trade roles: projects are won by various members of the group, who take turns hiring one another to fill roles that align with each person's specialty.

“Our office uses flexible work schedules, financial transparency, and consensus decision-making to foster a culture of shared ownership, which leads to more efficient and better work.”

**Oscia Wilson, AIA
Founder, Boiled Architecture**

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AIA Resources for Small Firms

More information on programs like these and the Small Firm Round Table are available on the AIA website:

network.aia.org/smallfirmroundtable/home/

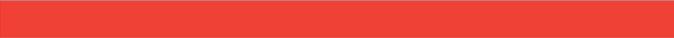
APP (Architect's Professional Primer)

Developed with several AIA Knowledge Communities, APP is an innovative and dynamic web app to help emerging professionals and small firm owners locate relevant, up-to-date information for practice and to develop a career in architecture.

SFx (Small Firm Exchange) AIA Convention Track:

Workshops, educational seminars and social events addressing topics such as marketing, risk, mentoring, employee relations, social media, and professional advocacy for the small firm owner and independent practitioner.

PROFESSIONAL PRACTICE



Like the environment in which design businesses operate, the professional practice of architecture is responding to significant forces of change.

Technology driving practice

From designing high-performance buildings to innovating materials and leaner construction methods, technology is a dominant force in shaping the future practice of architecture and design for the built environment.

Apps, mobile and cloud

Within the mega-trend of technology, mobile computing via apps and hardware (and now wearables) continue to advance.

According to ENR, software developer **QuadriSpace** has developed Publish-er3D, which can turn a 3D model from SolidWorks, Inventor and other modeling software into a file that's light enough to be viewable with an iPad or iPhone. The company's other tools, including Share3D, enable mobile sharing, collaboration, and mark up of 3D files, which can have

significant impact on how construction documentation is handled in the field.

Mobile 3D capture

In "The 3D Future of Your Smartphone Camera," the Atlantic profiles the Matterpoint system, which uses a combination of a specialized camera, iPad software, and cloud-based servers to process the data into a 3D rendering of the environment where the imagery was captured. Though the current system is designed for professionals, **Matterpoint** CEO Bill Brown predicts that in the future all cell phone photos could have a 3D component.

Wearable technologies

Though **Google Glass** may be grabbing headlines in wearables, there are many technologies currently available or coming soon that will affect the AEC and design industry.

(Continued on page 24)

Building performance resources

Building Performance Center
buildingperformancecenter.org

Global Buildings Performance Network
gbpn.org

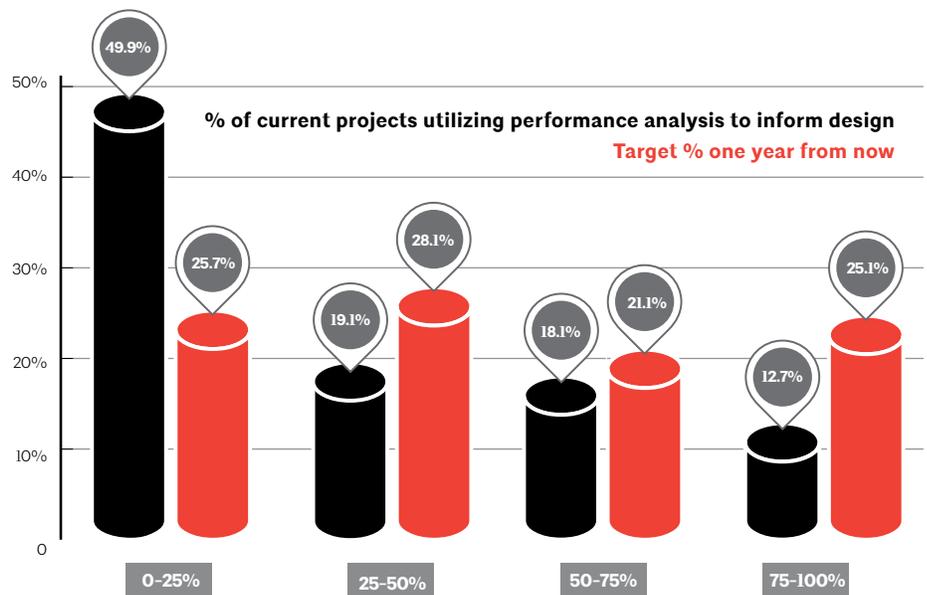
BRIK (Building Research Information Knowledgebase)
brikbase.org

Department of Energy (DOE) Buildings Performance Database
bpd.lbl.gov

ULI Greenprint Center for Building Performance
uli.org/research/centers-initiatives/greenprint-center/

USING PERFORMANCE ANALYSIS TO INFORM DESIGN

SOURCE: SEFAIRA (SIC)



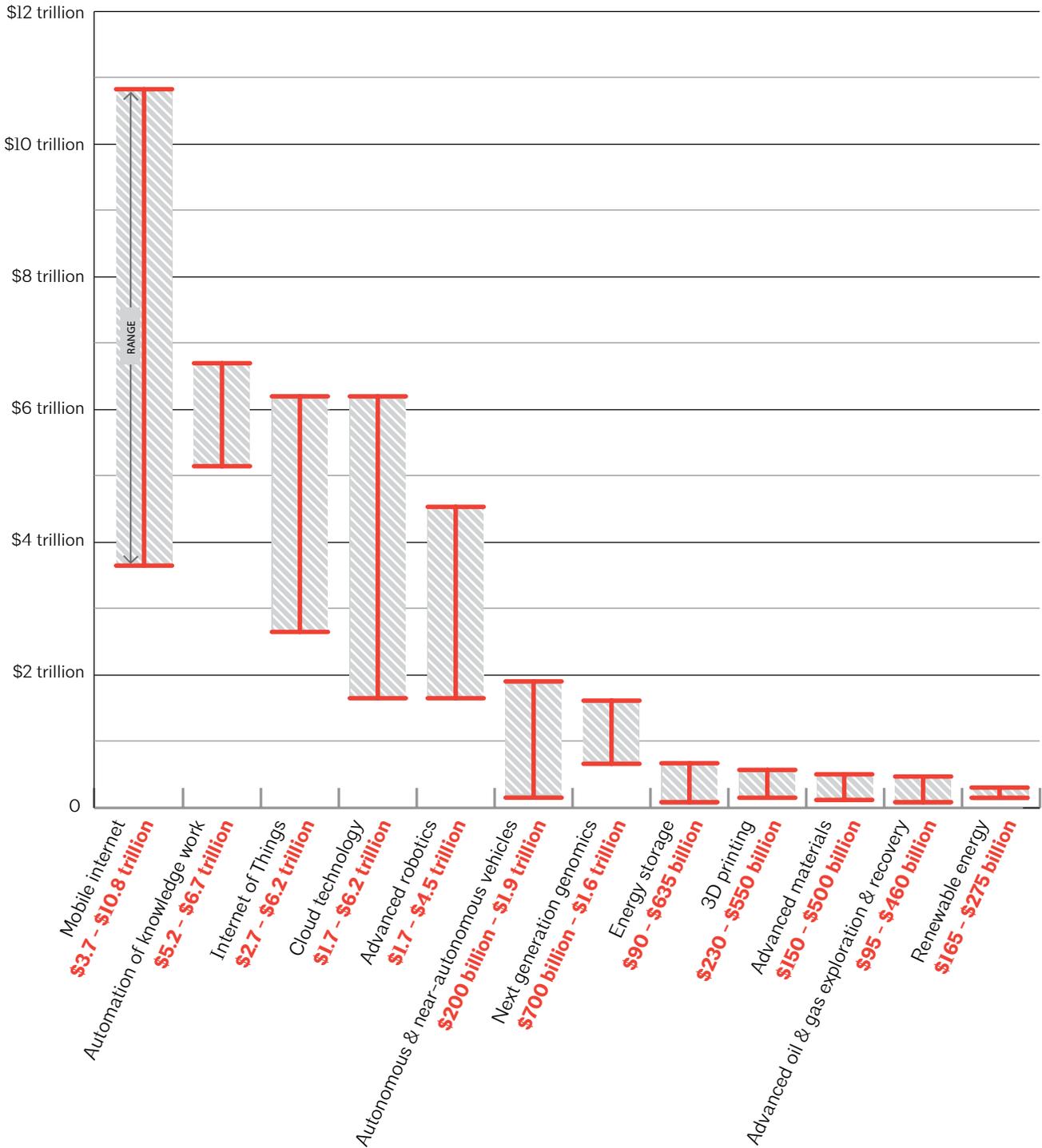
ECONOMIC IMPACT OF DISRUPTIVE TECH

In a May 2013 report titled “*Disruptive Technologies: Advances that Will Transform Life, Business, and the Global Economy*,” the McKinsey Global Institute (MGI) attempted to identify the top technologies likely to affect the world in the

coming decade. In order to determine which technologies were most important, MGI examined four characteristics: rapidly advancing, broad potential impact, significant economic impact, and potential for economic disruption.

ESTIMATED ECONOMIC IMPACT: 2025

SOURCE: MCKINSEY GLOBAL INSTITUTE



In addition to communication and access to project data, one area of serious investigation for the AEC community is worker safety on construction sites. Innovation consultancy **Human Condition Institute** is developing concepts for wearables that address the four most common hazards for workers as well as job site security, worker efficiency and overall analytics.

A story in the *Irish Examiner* cited David Evans, the chief futurist at Cisco who recently addressed the Wearable Technology Conference in London, who predicts that as wearable technology evolves and shrinks it will come to be used inside the human body.

IoT: the other embedded technology

Technology that is embedded in objects, infrastructure and buildings has been described with a variety of terms, including “Internet of Everything” and recent favorite “**Internet of Things (IoT)**.” McKinsey Global Institute predicts that by 2025 the IoT will have approximately \$2.7 - 6.2 trillion impact on the global economy.

Cisco Systems, which appears to have invested heavily in the IoT, articulates the benefits of embedded technologies: “more data, gathered from more places, with more ways to increase efficiency and improve safety and security.” And more than likely, new ways in which owners, operators and users will interact with the built environment.

Robotics

Robots for construction work, also called unmanned systems, can take many forms: from ground-based, stationary units like Construction Robotics’ SAM system to multi-rotor drones that could be used to inspect or build structures.

In order to facilitate faster adoption of unmanned systems, companies like **Dream-**

Hammer are developing software that can be used with multiple systems—a common platform akin to the iOS operating system that powers Apple’s mobile devices.

Robots are not only envisioned for construction, but also for demolition. Currently **Brokk** and **Husqvarna** produce commercially available robots that while not yet autonomous do provide a peek into what may come.

3D printing

While initial forms of 3D printing have been available for years and firms are actively using the technology for model-making and design prototyping, there is much discussion in the marketplace about uses for finished projects and consumer applications.

Greg Morris, business development leader for additive manufacturing at GE Aviation, was **quoted recently in Businessweek** about the near-term feasibility of the wide application of 3D printing: “We can start ramping up with the current generation of technology, but within two to three years we’re going to have to be onto the next generation to meet our cost targets.”

MarketWatch, a blog of the Wall Street Journal, **recently reported that USC professor Behrokh Khoshnevis** was testing a 3-D

Architects will be “makers”...

...using technologies that will enable rapid prototyping of design solutions and sharing them instantly and in greater detail. A new design palette of the Internet of Things (IoT) provides designers with new and exciting solutions that provides interactivity with physical space where the building becomes a computer. Imagine each building have their own version of Apple’s Siri, providing an empathic and sincere relationship with each inhabitant. Upon entering your building’s “zone,” you are recognized and greeted by the building, instantly transported into having the building become your personal assistant/ concierge. Architects will design this holistic “experience” taking over the traditional role of the technology “user experience” professional.

Paul Doherty
President/CEO, the digit group

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AEC Hackathon

AEC Hackathons are a series of non-profit events that create on-the-spot teams of technologists and industry stakeholders to shape the future of the built environment. At the event, tech experts partner with AEC professionals for a weekend to develop solutions to a certain challenge or problem in the AEC industry. The Hackathon cultivates an iconoclastic spirit in which the participants seek to “break things” and rebuild them from the ground up rather than simply providing a digital solution to fit the traditional process. The result is not only a new way of approaching an old problem, but also the creation of a sense of community.

One constant for firms in the future...

...will be the continuing incorporation of technology, sustainability and accessibility. The other constant is change. Adapt quickly or die. Architecture is a service industry driven by cyclical economics and market needs and locales. It is a world market that also focuses locally. What's exciting about the firm of the future is that can take so many forms. Collaborative technologies allow both virtual and actual offices. The future will provide opportunity for those who think outside the box and are willing to drive their own careers and firms.

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Shawn Alshut
Principal, Studio A2

printer that could build a 2,500-square-foot house in 24 hours using a technology called “contour crafting.” The same story cited the state news agency Xinhua report that private Chinese firm ZinHa has used huge 3-D printers to construct 10 full-sized homes in China in just 24 hours.

Biomimicry: the self-healing facade

As part of their work with autonomous materials, researchers at the University of Illinois at Urbana-Champaign are working on **self-healing polymers** that emulate nature. When damaged, the polymer uses either small capsules or a micro-vascular network to deliver a healing agent to the affected areas.

Green walls

While many focus on emulating the principles of nature in building design, the BIQ house in Hamburg, Germany, has become the first structure to use microalgae as an integral part of the building. According to the **International Building Exhibition IBA Hamburg website**, the BIQ is able to generate energy using the algae biomass harvested from its own façade. Moreover, the façade collects energy by absorbing the light that is not used by the algae and uses it to generate heat.

Programmable materials

Though their work is still more concept than reality, materials scientists at the **Swiss Federal Research Laboratory (Empa)** have developed models of materials that can react to changes in sound or vibration in their environment. Such **programmable materials** could adapt at lightning speed to muffle sound or vibration in their environment.

See-through solar cells

Researchers at the University of Michigan (U-M) are developing **colorful, see-through solar cells** that could open a myriad of options for designers. Jay Guo, a professor

of electrical engineering and computer science, mechanical engineering, and macromolecular science and engineering at U-M, explains the ramifications: “I think this offers a very different way of utilizing solar technology rather than concentrating it in a small area...Today, solar panels are black and the only place you can put them on a building is the rooftop. And the rooftop of a typical high-rise is so tiny. We think we can make solar panels more beautiful—any color a designer wants. And we can vastly deploy these panels, even indoors.”

Crowdsourcing & co-creation

Many of the fundamentals of the design and delivery process are changing, including the relationship between clients, users, and designers. And technology is playing a fundamental role in driving innovation.

Betaville is an “open-source mirror-world” that allows diverse subject matter experts as well as community members and others to share, discuss and tweak ideas about new works of public art, architecture, urban design and development. The web platform is being developed by an international team of partners in the U.S., Germany, Turkey and Canada.

Stickyworld is a web-based SAAS (software as a service) that allows potential end users of architectural and other projects to post virtual sticky notes on top of different types of digital images. Design teams can field questions and receive feedback from users and communities in order to inform the process of creating buildings and spaces.

Disruptive models

Arcbazar is a crowdsource architectural design contest site founded in 2010 by Dr. Imdat As, a graduate of both MIT and Harvard GSD. Arcbazar’s purpose, according to the organization’s website, is to be “the

first-of-its-kind online competition webpage for small to medium scale design projects to allow an easy and fast connection interface between clients, young architectural designers and contractors.”

Predictably, Arcbazar has been controversial since its founding in 2010. Famously called “the worst thing to happen to architecture since the Internet started” by Dwell, the site continues a trend toward crowdsourcing of professional services since sites like [99designs.com](#) began disrupting other design disciplines.

Crowdfunding the built environment

In an ArchDaily post titled “Can You Crowdfund a City?” writer Vanessa Quirk highlighted several examples of technology platforms that allow for coordination and funding for civic projects in the U.S. and U.K. The AIA weighed in as well, issuing a report that details the opportunities and implications of crowdfunding on architectural practice.

[Neighborland](#), an online community tool focused on neighborhood development, enables residents to identify needs for projects, garner support among fellow residents, and “make things happen.”

[Spacehive](#), a U.K.-based initiative also mentioned in Quirk’s story, exists to “make it easy for lots of people, companies and councils to fund things that make places better” and “allows (users) to build support direct from your community.”

Productivity: the “Technology Paradox”

Despite the assumption that sophisticated design technologies greatly increase productivity of architects, some data may indicate otherwise.

Daniel Davis, writing in *Architect magazine* in May of 2014, summarizes research find-

ings of Paul Teicholz, a professor emeritus of environmental and civil engineering at Stanford University: “Between 1964 and 2012, the construction industry’s productivity dropped 0.32 percent per year, according to Teicholz’s analysis of data from the Bureau of Labor Statistics. In other words (if productivity at architecture firms mirrored those trends from the broader construction industry), a \$100-million hospital (adjusting for inflation) would take roughly 20 percent more staff-hours to design and build today than it did in 1964.”

While increases in regulatory requirements and technical complexity of medical equipment and building systems may be factors in the hospital example, Davis attributes the drop in general to architects passing productivity savings to their clients in the form of lower fees. However, recent data from McGraw-Hill Construction and the U.S. Department of Labor shows a sustained decline in both construction value per employee and square feet designed per employee during the past 15 years.

Productivity is typically measured as the output per hour of labor cost of a project divided by the staff-hours spent to complete it.

Despite initial appearances, there are complications with this measurement according to [Kermit Baker](#), chief economist at the AIA. One issue may be that productivity gains could be in quality rather than quantity of output. Another may be the amount of design activity devoted to renovations and retrofits to existing facilities, which are not tracked nearly as accurately as new construction. Still other complications include architects’ work in facilities management, strategic facilities planning, general planning, pre-design, or other areas that don’t show up as construction activity.

“As the built environment becomes more technologically driven, infusing that realm with the human element for an intuitive and inspiring experience is where the architect can have the most meaningful impact on design.”

Melissa Duffy, AIA
Principal, [STUDIOS Architecture](#)

DESIGN THINKING: ALIVE AND THRIVING

Innovation in process & practice

Though the term “design thinking” has been present in business literature for the better part of a decade, the underlying concepts show no signs of falling out of use.

Crossing disciplines in design classrooms

The increasing number of graduate programs that incorporate business and design testify to the business community’s investment in design thinking.

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The trend began in the 1990’s with the founding of the Design Management program at [Pratt Institute](#), followed by the Hasso Plattner Institute of Design at Stanford (known as the [d.school](#)) in 2005 and the [IIT Institute of Design and Stuart School of Business joint Master of Design/ MBA](#) one year later.

Since then, design management programs have been developed at the [California Col-](#)

[lege of the Arts, Parsons the New School for Design, Philadelphia University, Ferris State University/Kendall College of Art & Design, and Johns Hopkins \(with Maryland Institute College of Art\)](#). In September 2013 Case Western Reserve University Weatherhead School of Management established a [Department of Design & Innovation](#).

Next evolution of multidisciplinary practice

Though firms have been practicing across design disciplines for years, some are redesigning themselves in order to attack problems with the modality of design thinking, using a holistic approach.

Firms like [IDEO](#) and [MAYA Design](#), which were once considered industrial design firms, have specialists not in products but rather a design-based innovation process. Unlike IDEO, MAYA created a spinoff company to focus on its innovation process work: [LUMA Institute](#).

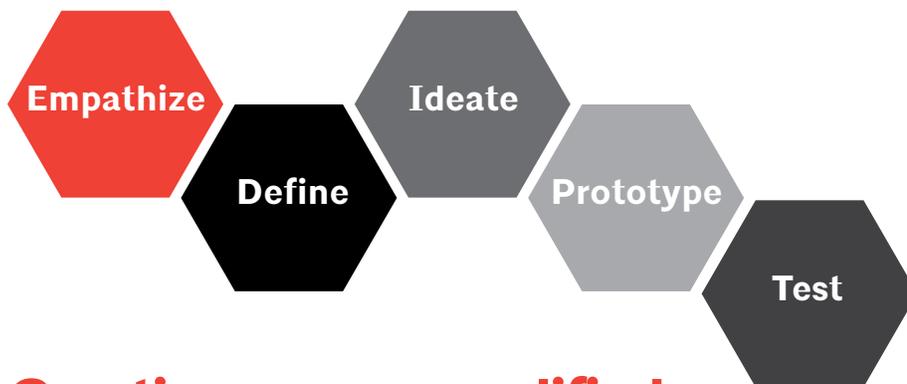
D.C.-based [Hickok Cole Architects](#) recently [launched a full-service advertising](#) component that specializes in branding, identity and print projects. While many architecture and interior design firms already help clients express their brands through physical space, Hickok Cole is venturing deeper into disciplines that extend beyond architecture.

[Streetsense](#) is a Bethesda, MD and Washington D.C. firm structure that crosses the boundaries that separate disciplines and even designer/client. They define their role broadly: “Together we create memorable places, distinctive brands, and meaningful experiences.” The firm offers not only integrated architecture, interiors, and planning but also branding and marketing, brokerage, real estate strategy, development, research, analysis, and food/beverage consulting.

New skill sets for design professionals

Writing in “[Meta Skills](#),” Marty Neumeier says that there are five critical skills in an age of “nonstop innovation.”

1. Feeling—empathy and intuition and social intelligence
2. Seeing—systems thinking, or the ability to think whole thoughts
3. Dreaming—applied imagination
4. Making—design and testing, or mastering the design process, including skills for devising prototypes
5. Learning—autodidactic ability to learn new skills and will



Creative process codified

Founded in 2005, the Hasso Plattner Institute of Design at Stanford ([d.school](#)), bases its program on the design thinking approach. The school’s method shares an iterative, user-centered approach with [IDEO](#), which was founded by the “lead creator” of the [d.school](#).

Source: Stanford University, IDEO

[Wayne Li](#), a former IDEO consultant who graduated from Stanford’s design program, has developed the Innovation & Design Collaborative (IDC) program at Georgia Tech based on five key skills that complement both Neumeier’s list and the steps in the [d.school](#) design thinking methodology (see next page).

TENETS FOR THE 21ST CENTURY DESIGNER

From Wayne Li, the Oliver Professor of Practice in Design and Engineering at Georgia Institute of Technology

What are the five key skills designers of all types will need in a world of rapid change? Stanford Design alumnus, Georgia Tech professor, former IDEO consultant and car designer Wayne Li has an answer.



Contextual Awareness

21st century practitioners, design thinkers, and entrepreneurs must bring a newfound attention to context and situation. Current trends in meta-thinking engage the modern designer to contemplate not what is known or seen, but the implicit, hidden forces at work. This state of inquisitive curiosity spurs innovative solutions that disrupt markets.



Creative Craft

The creative confidence to bring any idea, whether it be product, environment, service, performance, policy, or business, to a realization where it can be tested against an audience. Flexible prototyping skills that matches the prototype's fidelity and resolution appropriate to the stage of development.



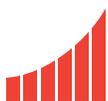
Rapid Iteration

Additive manufacturing, low-fidelity prototyping, agile development, and the push for flexible manufacturing all point to one main trend—Ever quicker cycles between the expression of an idea, and the solicitation of feedback from the audience. You gain more from multiple cycles made with users' feedback than from a single, high resolution solution.



Empathy

An open mind, tolerance for others, and a beginner's view are critical empathic skills exhibited by the 21st century designer. Seek first to understand others different than you, rather than judge or categorize them. The ability to channel a subcultural group, "method act" their life, rather than dictate their behavior, speeds the adoption of the design.



Entrepreneurial Sustainability

For a design intervention to endure, the business model must be sustainable. Value, benefits, resources and costs must be in perfect balance. All great designers have been keenly aware of this alignment. "Anything that won't sell, I don't want to invent. Its sale is proof of utility, and utility is success." - Thomas Edison

DESIGN WITH PURPOSE

Wider contributions for
architecture

From shaping the built environment's role in preserving natural resources to finding ways in which design can improve society, architects are focused on making a positive impact.

In an article that appeared in the New York Times, **Michael Kimmelman** wrote that the “jury for this year’s **Pritzker Prize** sent a clear message” in choosing Japanese architect Shigeru Ban as the award’s 2014 recipient. Ban is known not only for the type of high-end portfolio that traditionally garners interest from the Pritzker, but also for disaster relief and temporary shelters. Kimmelman cites the prize as a signal of the growing trend toward social consciousness in architecture.

“Creative insurgent” pushes “thinking wrong” for doing good

AIGA fellow and graphic designer John Bielenberg created **Project M**, an organization that promotes design-based interventions to social issues. Bielenberg’s emphasis on “thinking wrong” refers to challenging the mental habits that stifle innovation in designing interventions that address social issues.

According to the organization’s website, it has already developed projects in Alabama, Baltimore, Connecticut, Costa Rica, Detroit, Germany, Ghana, Iceland, Maine, Minneapolis, and New Orleans.

DSIC: Entrepreneurship for change

Verb, an initiative that began at the University of Texas, uses the contest format to promote entrepreneurship in addressing social issues such as health, urbanization, water sanitation, education and more. After a \$5 million grant from Dell, the contest was renamed the **Dell Social Innovation Challenge** in 2009. In seven years of competitions, the organization has awarded over \$800,000 to early-stage social entrepreneur teams for projects in Africa, Asia and elsewhere.

“Health is not a Building Typology”

In a story that appeared in EcoBuilding

Pulse, **writer Katie Weeks** described the central message of the AIA’s Design and Health Summit in Washington, D.C: all types of architecture are vital in helping create healthy lifestyles. Rear Admiral Boris Lushniak, the acting U.S. surgeon general, as well as members of the senior leadership at AIA emphasized the opportunity that all architects have to make a positive difference through best practices in planning and design.

Sustainability and environment

The EPA estimates that the U.S. generates 170 million tons of construction & demolition (C&D) waste in one year. The U.S. Energy Information Administration (EIA), has said that buildings consume 47.6% of all energy produced in the United States and according to nonprofit **Architecture 2030**, the building sector was responsible for nearly half (44.6%) of U.S. CO₂ emissions in 2010.

As designers of the built environment, architects have the opportunity to play a foundational role in reversing these trends and supporting a healthier world.

Integrated design...

...a holistic approach where designers look at all the systems together, as one interdependent mechanism, working in harmony rather than against each other—will become ubiquitous in the practice of architecture. These integrated systems will also be designed to achieve a net-zero energy balance as the norm rather than the exception, and occupants will understand and interact with their living and working environments to not only contribute to this balance of energy consumption and regeneration, but also to improve their own productivity and healthy living.

Ted Hyman, FAIA
Managing Partner, ZGF Architects

“We have a partnership—public health professionals and architects and planners. Our minds have to talk because we have an influence on America’s public health that we’re only now beginning to grasp.”

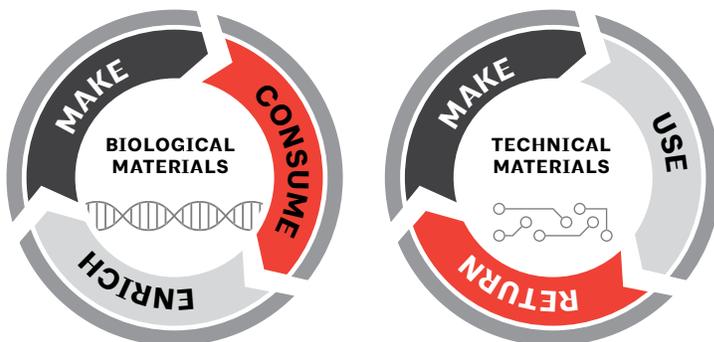
Rear Admiral Boris Lushniak
Acting U.S. Surgeon General

THE OLD AND NEW ECONOMIES

SOURCE: ELLEN MACARTHUR FOUNDATION



ENERGY FROM FINITE SOURCES



ENERGY FROM RENEWABLE SOURCES

World's Greenest Office Building

In a story titled "A Building Not Just Green, But Practically Self-Sustaining", New York Times chronicled the opening of the **Bullitt Center** in Seattle. The six story, 50,000-square-foot structure is called the world's greenest office building because of features like a 56,000-gallon rainwater cistern and rooftop array of photovoltaic panels that will produce an estimated 230,000 kilowatt-hours a year. Notably, the building has no off-street parking and features an "irresistible staircase" that encourages occupants to walk rather than ride between floors.

Circular economy

The term "circular economy" describes an economy that is regenerative by design: stuff that is produced is used and then returned to the system as a raw material for another generation of products.

The **Ellen MacArthur Foundation** works in education, business innovation and analysis to accelerate the transition to a circular economy.

The circular economy aims to rely on renewable energy; to minimize, track, and hopefully eliminate the use of toxic chemicals; and to eradicate waste through careful design. The foundation intends for the term to go beyond the mechanics of production and consumption of goods and services in the areas that it seeks to redefine. Examples include rebuilding social and natural capital as well as shifting from a waste-based consumer society to a reuse-based one. The concept of the circular economy is grounded in non-linear systems of the type that are found in nature.

Among its other programs, the foundation created the **CE100**, a global platform that connects leading companies, emerging innovators and regions in order to accelerate the transition to a circular economy. The CE100 includes organizations such as the Scottish government, Philips, H&M, Cisco, Coca-Cola, AeroFarms, Nespresso, and Ikea.

RDoC: resilient healthcare facility

Perkins+Will, in conjunction with **Degenkolb Engineers**, **Mazzetti Engineers**, **Public Architecture**, and **Alliance Health of San Francisco**, developed a concept for a rapidly deployable health clinic and pharmacy (**RDoC**) that can be used as a replacement venue for critical ambulatory health services in the aftermath of a seismic or

severe weather event. The project was originally conceived in San Francisco to address a potential gap in the healthcare system if a significant earthquake were to damage the community based network of small clinics and other healthcare outlets.

Closing the resource loop: Design for Deconstruction/Disassembly (DfD)

The [U.S. Geological Survey estimates](#) that 60 percent of materials flow in the US economy (excluding food and fuel) is consumed by the construction industry. According to the [EPA manual on Design for Deconstruction](#), construction is one of the largest users of timber, and buildings are among the largest consumers of copper, steel, and polyvinyl chloride (PVC).

The DfD movement was created to help those in the design and building industries responsibly manage end-of-life building materials in order to minimize consumption of raw materials.

Some manufacturers have begun to incorporate DfD principles into their products. One example is [TacTiles](#), a carpet tile system by [Interface](#) that replaces the need for adhesive with a biomimetic design based on the natural system geckos use to cling to surfaces.

Buildings can also be designed to facilitate separation of various components at the end of the building's lifespan. For example, at the [SLU Discovery Center in Seattle](#) the electrical, lighting, and mechanical systems are each contained within 40-foot modules for practical disassembly and reassembly.

Demolition Innovation

A recent [Wired Magazine](#) article titled "[Japan's Quiet Skyscraper-Demolition Technique Generates Energy](#)" profiled the efforts of [Taisei Corporation](#) in using its

[Ecological Reproduction System \(Tecorep\)](#) to demolish a skyscraper in ways that are more sensitive to the environment and local community.

Taisei demolishes a building from the top down, floor by floor, in a giant "disassembly factory" on the upper section of the building. Work continues despite the weather, and the crane that lowers material to the ground generates energy to power other equipment on site.

The net result? Noise is reduced between 17 and 23 decibels, dust levels are cut back by 90 percent and carbon emissions are reduced by 85 percent.

Arid Lands Institute

The [Arid Lands Institute](#) is a self-sustaining education, outreach, and applied research center of [Woodbury University](#) that focuses on issues of water use and the design of the built environment.

ALI's mission is to "train designers and citizens to innovate in response to hydrologic variability brought on by climate change." The organization envisions a water-smart built environment in the western United States that can serve as a model for dry lands globally.

Speaking in an interview on Los Angeles radio station [KCRW's DnA \(Design and Architecture\) show](#), Founding Co-Director Hadley Arnold predicts that in the future, drought conditions will require a fundamental re-thinking of water use. She suggests, for example, that more surfaces serve as catchment areas and that we may see more fit-for-use or multi-tier water reclamation systems, which will require a shift in how people view "clean" water and the role of the built environment relative to it.

The Circular Economy: a material example

The Lifecycle Building Center (LBC) is an Atlanta-based nonprofit organization that diverts usable building materials from landfills to opportunities for reuse and educates homeowners and others to implement energy-saving, sustainable solutions.

Executive Director Shannon Goodman explains how she was first inspired to help found the LBC while practicing as an architect: "Working with Perkins+Will to salvage and donate 62 tons of building materials from their Atlanta office renovation opened my eyes to the tremendous impact that designers and building owners can have on their communities by requiring material salvage prior to demolition. The project also highlighted the fact that Atlanta did not have the infrastructure needed to process large flows of salvaged materials and redirect them back into local construction projects. If material donations from one commercial office building could help area nonprofits save \$384,000 in material costs, then there was clearly demand for these materials and Atlanta needed an organization that could effectively manage and distribute the available supply."

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International Resources

International Monetary Fund
imf.org

Organisation for Economic Co-operation
and Development (OECD)
oecd.org

United Nations Economic and Social
Commission for Asia and the Pacific
(UNESCAP)
unescap.org

United Nations Statistics Division
unstats.un.org/unsd/default.htm

World Bank data source
datacatalog.worldbank.org

U.S. federal, state and local government resources

Bureau of Labor Statistics
bls.gov

Congressional Budget Office (CBO)
cbo.gov

DOE Buildings Performance Database
bpd.lbl.gov

United States Census Bureau
census.gov

U.S. Commercial Service Global Design &
Construction Team
export.gov/industry/architecture/

Trade organizations and non-profit resources

Academy of Neuroscience for Architecture
anfarch.org

American Institute of Architects
aia.org

Architecture 2030
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aridlands.org

Associated General Contractors of America
agc.org

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brookings.edu

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conference-board.org

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America
coaa.org

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curt.org

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CBPCA)
cbpca.org

Global Buildings Performance Network
(GBPN)
gbpn.org

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leanconstruction.org

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lifecyclebuildingcenter.org

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humancentereddesign.org

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affiliate (IBPSA-USA)
ibpsa.us

International Association for Automation
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iaarc.org

The Missing 32% Project
themissing32percent.com

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noma.net

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thevalueofwater.org

Blogs and podcasts

99% Invisible
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bigthink.com/blogs/design-for-good

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pewsocialtrends.org

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citylab.com

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