



Results of the 2007 Design Engineering Firm CIO Survey

FARKAS BERKOWITZ & COMPANY



May 9, 2007
Washington, DC

2007 Engineering Design Firm CIO Survey Results

Farkas Berkowitz & Company and Bentley Systems, Incorporated recently conducted their first annual Engineering Design Firm CIO Survey. The purpose of this online survey was to gauge the current state and future outlook of information technology (IT) at leading design engineering firms.

CIOs representing design engineering firms with more than \$15 million in revenue were invited to participate in the fifteen-minute confidential online survey. Eighty-one CIOs participated. Revenue of participating firms ranged from \$16 million to \$19 billion.

The number of employees at these firms ranged from 160 to 55,000, and the number of IT employees ranged from 4 to 3,500. The IT budgets ranged from \$600,000 to \$200 million. More than 90 percent of the firms that participated are headquartered in the U.S.

The survey asked about IT's impact on productivity, IT's impact on collaboration, software interoperability, internal IT practices, major concerns of CIOs, and IT's interaction with the rest of the firm. Key findings of the survey follow.

Information Technology's Impact on Productivity

Respondents were asked questions relating to the impact IT can have or is having on productivity at their firms. They were first asked if their firms had introduced IT innovations that enabled them to improve the productivity of engineering services over the last five years. Ninety-nine percent of the respondents answered in the affirmative. When asked to quantify the productivity improvements due to IT innovations:

- Forty-three percent said they believe productivity increased 10 to 25 percent.
- Nineteen percent said they believe productivity improved more than 25 percent.

Many of the remaining respondents did not know how much productivity increased as a result of the IT innovations.

This means that most respondents believe IT is having a tangible impact on productivity. When asked to allocate the extent to which current impediments to improving productivity are related to IT versus organizational factors, on average respondents allocated 30 percent of the impediments to IT and 70 percent to organizational factors.

Respondents were then asked to estimate the level of productivity improvements they can realize in the next five years from IT innovations:

- Forty-eight percent said they believe that they can realize improvements of 11 to 25 percent.
- Twenty-three percent said they believe productivity gains could be greater than 26 percent.

When asked to identify specific aspects, areas, or technologies that will lead to these productivity gains, 48 percent of the respondents pointed to collaboration tools. Building information models, WAN efficiency, knowledge management, and IT training each were identified by more than 10 percent of the respondents as ways to realize additional productivity improvements.

Information Technology's Impact on Collaboration

Many of the respondents believe that the more a firm collaborates on projects, the more successful the project and the firm will be. IT resources can play a major role in collaboration, both internally and externally. Respondents were asked questions relating to the impact IT can have or is having on collaboration at their firm.

They were first asked if their firms had introduced IT that enabled them to improve collaboration over the last five years. Ninety-six percent answered in the affirmative. Of those who answered in the affirmative:

- Twenty-seven percent of respondents said they believe collaboration increased 5 to 10 percent over the last five years due to IT innovations.
- Thirty-five percent said they believe collaboration improved more than 25 percent, but less than 50 percent.
- Eighteen percent said they believe collaboration improved greater than 50 percent.

This means IT is having a tangible impact on collaboration. When asked to identify in an open-ended manner specific aspects, areas, or technologies that will lead to collaboration, document management tools received the highest percentage of responses (17 percent). Project portals, Microsoft SharePoint, and WAN acceleration technologies were also each cited by more than 10 percent of the respondents.

When asked to allocate the extent that current impediments to improving collaboration are related to IT versus organizational factors, on average respondents allocated 35 percent of the impediments to IT and 65 percent to organizational factors.

Respondents were then asked to share more detailed thoughts on collaboration. Eighty-five percent of respondents agreed or strongly agreed with the statement that collaboration frequently takes place across organizational and geographic boundaries, while only nine percent disagreed. Fifty-one percent of respondents also agreed or strongly agreed with the statement that specialists within the firm can be easily identified to meet any project need. However, 27 percent of respondents disagreed or strongly disagreed with that statement.

It does not help, however, if the specialists can be identified but not accessed in a timely way. Fifty-nine percent of respondents agreed or strongly agreed with the statement that specialists can, in fact, be accessed in a timely way. Only 19 percent of respondents disagreed or strongly disagreed with this statement.

To follow with excellent collaboration results, 70 percent of respondents agreed or strongly agreed with the statement that it is common for individuals in different offices to contribute to a given project either on a real-time basis or by handing off a work product from one regional time zone to the next. Only 17 percent disagreed or strongly disagreed with this statement.

However, 45 percent of respondents agreed or strongly agreed with the statement that collaboration is mainly based on an individual's personal relationships. Thirty percent disagreed or strongly disagreed with this statement. So, the question is: How can IT also help strengthen those personal relationships?

Software Interoperability

One barrier to IT success overall is interoperability between software. Respondents were asked about their views on interoperability. Respondents were first asked whether they believed that the absence of interoperability cost is growing. Fifty-four percent of respondents answered in the affirmative. Twelve percent of respondents said they believe the cost is shrinking. Thirty-one percent of respondents said they believe the cost is staying the same.

Respondents were asked in an open-ended manner what IT vendors they think are contributing collectively to a solution for the lack of interoperability. Respondents were allowed to share more than one vendor. Bentley was cited by 46 percent of the respondents as a vendor that is helping to solve the interoperability problem, while Microsoft was cited by 41 percent. The next three vendors cited were Autodesk (14 percent), Intergraph (14 percent), and Cisco (11 percent). No other firm was cited by more than 10 percent of the respondents.

Respondents also were asked to share which IT vendors they think are impeding solutions to increasing interoperability. Respondents were allowed to share more than one vendor. The top two, and the only two that were cited by more than 10 percent of the respondents, also show up on the list of those contributing collectively to a solution for the lack of interoperability.

Autodesk was cited by 31 percent of respondents and Microsoft was cited by 22 percent of respondents as being among IT vendors that are impeding solutions to increased interoperability.

Internal Information Technology Practices

Every IT department has a unique way of doing business and meeting its goals. Respondents were asked a series of questions relating to how they run their department.

The authors learned that many of the respondents (44 percent) have never implemented outsourcing for their IT practices. Very few responded that they outsourced all except strategic functions in IT (8 percent), that they outsourced the help desk only (5 percent), or that they outsource all of IT (4 percent). The rest undertook a variety of unique outsourcing strategies.

The future remains unclear about outsourcing. Thirty-one percent of the respondents agreed or strongly agreed with the statement that over the next five years, IT outsourcing at their firms is expected to increase. However, 24 percent of the respondents disagreed or strongly disagreed with the same statement. The remainder of respondents neither agreed nor disagreed with the statement.

On the flip side, many respondents stated that their firms in-source. In-sourcing is defined as charging out IT professionals to the firm's clients (i.e., owner operators) to assist the firm's clients with IT implementation or innovation:

- Forty-one percent of the respondents' firms currently in-source.
- An additional 15 percent do not currently in-source, but do expect to in-source in the next five years.
- Thirty-four percent do not in-source and do not expect to in-source in the next five years.
- The remainder were unsure of their in-sourcing practices.

So, although respondents are not outsourcing their own IT functions, they are hoping that their clients will.

Those respondents whose firms currently in-source or plan to in-source within the next five years provided examples in an open-ended format of the IT functions that they do in-source or plan to in-source:

- Twenty percent offered application development as an example.
- Sixteen percent offered Web development as an example.

No other item was offered by more than seven percent of respondents. However, other IT functions currently or planned to be in-sourced included network design, GIS services, 3D consulting, and collaborative technologies.

Many firms create their own proprietary software to gain a competitive edge in the marketplace or to increase efficiency and reduce costs in the firm. Most of the respondents (85 percent) support their own firm-developed software, although the survey could not distinguish the types of software. Of these, 40 percent said they expect an increase over the next five years in their support of firm-developed software, while slightly less (31 percent) said they expect a decrease. Twenty-seven percent said they expect it to stay the same and the remainder of the respondents were unsure.

The respondents were asked about their views of software as a service. Software as a service is defined as a model of software delivery in which the software company provides maintenance, daily technical operation, and support for the software:

- Slightly less than a quarter (24 percent) of the respondents currently use software as a service.
- Forty-four percent currently do not use software as a service, but are interested in doing so.
- Only 26 percent do not currently use software as a service and are not interested in using software as a service.
- The remainder were not familiar with software as a service.

Undertaking design-build and other alternate delivery methods has become an increasingly common trend throughout the design engineering industry. Respondents were asked about their firms' views on these trends.

Respondents were first asked whether their firms undertook design-build and other alternate delivery methods. Eighty-four percent of the respondents stated that their firms currently do undertake these types of projects. Of those that do not, only 30 percent of the respondents said they believe that their firm is considering doing so.

Respondents were then asked if they agreed with the statement that their firms can profitably undertake these types of projects with existing IT resources. The vast majority of respondents (76 percent) either agreed or strongly agreed with that statement. Only six percent of respondents disagreed with the statement. None of the respondents strongly disagreed with the statement. The remainder of respondents neither agreed nor disagreed with the statement.

Information Technology's Major Concerns

All employees have a set of concerns that they struggle with everyday. Respondents were asked a set of questions to understand what it is that concerns CIOs of top engineering design firms.

When asked to pick the top three items keeping them up at night from a list of 10, including an “other” category:

- Sixty-nine percent of respondents chose meeting demand for services and expectations.
- Forty-six percent chose security.
- Thirty-one percent chose keeping up with technology changes.

Not surprisingly, infrastructure weaknesses, recruiting and retaining staff, and internal politics were all chosen by more than 20 percent of the respondents. Vendor relationships, business climate, and audit concerns all scored low and do not seem to be a major concern for the respondents.

Respondents were also asked to choose the top three IT security issues facing their firms out of a list of seven, including an “other” category. The number one security issue cited by 59 percent of

the respondents was protecting intellectual property. The next big virus or worm was cited as the second biggest security issue and was chosen by 51 percent of the respondents. Compliance and audit liability came in third and was chosen by 47 percent of the respondents.

Information Technology's Interaction with the Rest of the Firm

IT departments are not stand-alone departments. IT staff must interact with the rest of the firm and firm decisions impact IT and vice versa. To understand the interaction that IT departments have with their firms, respondents were asked a series of questions relating to how the IT department interacts with and is perceived by the rest of the firm.

Respondents were first asked how their firms set IT priorities for the year. Half of respondents said their firms set IT priorities with a formal IT steering team that has IT and operations ownership. Twenty-percent of respondents said that IT drives what the company does. Only 15 percent of respondents said that the CEO or CFO determines the IT priorities for the year.

The partial IT ownership in setting the IT priorities for the year may be a result of the fact that over half (51 percent) of the respondents said they believe their CEO would argue that the IT department is an operational enabler for the business, while an additional 37 percent of the respondents said they believe their CEO would argue that the IT department is a strategic enabler for the business. Only 11 percent of the respondents said they believe their CEOs would argue the IT department is a necessary cost center, while only one percent of respondents said they believe their CEOs would argue the IT department is a troublesome organization.

Supporting strategic business objectives was cited as the number one force in 2006 driving firms' IT objectives and was chosen by 78 percent of the respondents. Respondents were asked to pick their top three forces driving IT objectives from a list of seven. They also had the opportunity to add their own choice in an "other" category. The growth of the business was a close second in ranking and was chosen by 73 percent of the respondents. The third top choice, technical change, was chosen by 44 percent of the respondents.

Respondents were asked to choose the top three barriers to the success of IT at their firms from a list of 11 options including an “other” category:

- Unrealistic or unknown expectations were cited by 58 percent of the respondents.
- Lack of alignment between business and IT goals was chosen by 37 percent of the respondents,
- Constant business change such as mergers and acquisitions was chosen by 33 percent of the respondents.

Inadequate budgets, lack of IT talent, and turnover of IT staff were the lowest ranked barriers to IT success, chosen by 15 percent, 13 percent, and 9 percent of respondents respectively.

A lot of press in the last year has been devoted to the shortage of engineering professionals. The authors wanted to know if this shortage of qualified personnel also flowed through to IT professionals at engineering firms. Though the respondents said that lack of IT talent and turnover of IT staff are not major barriers to IT success that does not necessarily mean there is not a problem with recruitment and retention of IT professionals.

Respondents were asked to share their level of agreement with the statement that recruiting technical professionals is a major challenge or bottleneck for their firm. Sixty-one percent of respondents agreed or strongly agreed with the statement. Only 19 percent disagreed or strongly disagreed with the statement.

Even though most respondents think that recruiting technical professionals is a major challenge or bottleneck for their firm, fewer respondents believe that retention of technical professionals is a major challenge or bottleneck for their firm. Respondents were asked to share their agreement with the statement that retention of technical professionals is a major challenge or bottleneck for their firm. Only 35 percent agreed or strongly agreed with the statement, while 41 percent disagreed or strongly disagreed with the statement. The remainder of the respondents neither agreed nor disagreed with the statement.

To further understand the number of new IT employees joining firms in the coming years, respondents were asked to choose a range of what proportion of their firms' IT professionals would be new each year for the next five years. Fifty-six percent of the respondents said they believe that less than 10 percent of their firms' IT professionals will be new each year. Twenty-eight percent of the respondents said they expect to see 11 to 20 percent of new faces each year. Sixteen percent of the respondents said they expect to see greater than 20 percent of new faces each year. It is unclear whether these new faces will be a result of turnover or expanding IT staffs.

Respondents were then asked to share in an open-ended format their views on what IT strategies can help address the recruitment and/or retention of IT professionals at their firm:

- The top two strategies, flexible work schedules including time and location, and more training, were each cited by 27 percent of the respondents.
- The next two top strategies included better compensation and benefits and career planning.
- Growth and mentoring were cited by 26 percent and 21 percent of the respondents respectively.

Relative to the strategy of flexible work schedules, respondents were asked what percentage of their firms' staff teleworks full time. On average, respondents said that five percent of employees telework full time. The median was one percent and ranged from zero percent to 50 percent.

Training was also seen as an important strategy for retaining IT professionals. It follows that it is probably also an important strategy for retaining other engineering professionals in addition to being good for the company. Firms do not seem to be investing in incremental training for all staff for IT applications.

Respondents were asked a series of questions relating to traditional instructor-led and online training, both today and in the future, to gauge the level of investment in staff development throughout the firm. Respondents were first asked what percentage of their firms' staffs participate in traditional instructor-led training for IT applications annually. Forty-one percent of

the respondents stated that less than 10 percent of staff participate in traditional instructor-led training each year.

Respondents were then asked what percentage of their firms' staffs participate in online training for IT applications annually. Forty-four percent of respondents stated that less than 10 percent of staff is reached via e-learning approaches annually.

These numbers were surprising because 76 percent of the respondents believe that the payback period for investment in incremental staff training in IT tools will be less than one year. Another 22 percent of respondents said they believe the payback will be in less than three years. It seems that the respondents truly see value in training and yet are not fully utilizing it within their own firms.

About Farkas Berkowitz & Company

Farkas Berkowitz & Company is a management consulting firm serving companies that provide design, construction, and operational services for government and industry. Established in 1983, the firm assists clients with strategy, mergers and acquisitions, and operations improvement. Inquires should be addressed to Christopher Frangione at 202-833-7530 or frangione@farkasberkowitz.com or visit their website: www.farkasberkowitz.com.

About Bentley

Bentley Systems, Incorporated provides software for the lifecycle of the world's infrastructure. The company's comprehensive portfolio for the building, plant, civil, and geospatial verticals spans architecture, engineering, construction (AEC) and operations. With revenues now surpassing \$400 million annually, and more than 2,400 colleagues globally, Bentley is the leading provider of AEC software to the *Engineering News-Record* Top Design Firms and major owner-operators, and was named the world's No. 2 provider of GIS/geospatial software solutions in a recent Daratech research study. For more information, visit www.bentley.com.

Bentley and the "B" logo are either registered or unregistered trademarks or service marks of Bentley Systems, Incorporated or one of its direct or indirect wholly-owned subsidiaries. Other brands and product names are trademarks of their respective owners.