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Communications of the Association for Information Systems

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Boards of Directors and Technology Governance: The Surprising State of the Practice

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Abstract:

Companies spend anywhere from 1 percent to 10 percent of their gross revenues on information technology; some financial services companies actually spend much more. For a company with revenue in the \$5 billion range, this could mean an annual technology expenditure of \$500 million. Do boards of directors “govern” technology investments? Are they involved in major technology decisions? What role should they have in the acquisition, deployment and support of technology? The analysis reported in this document is based on a survey and follow-up interviews to more than 50 senior business technology executives. The findings reported benchmark the state of the practice—and suggest how companies can improve business technology governance.

The prescriptive literature suggests that it is time for boards to assume meaningful oversight of technology investments and strategies. The data we collected (and the interviews that we conducted) support the descriptive literature: there is relatively little board involvement in technology planning or oversight. The overall conclusion is that boards of directors do not participate nearly enough in major technology decisions, are surprisingly out of the technology loop on technology issues, and are therefore missing opportunities to optimize operational and strategic technology investments. The paper ends with recommendations about the role that boards of directors should play in technology decision-making.

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I. BOARDS AND TECHNOLOGY GOVERNANCE

Boards of directors are typically organized around committees with specific responsibilities. Everyone is familiar with audit committees, compensation committees, and acquisition committees, along with some other popular ones.

The literature on all this is interesting, to say the least. There is a disconnection between what observers and consultants believe the optimal business technology relationship should be and what our survey data and interviews suggest is reality in the trenches. For example, Nolan and McFarlan [2005] ask—and then suggest—the following:

A company that decides it needs board-level IT oversight must do three things: select the appropriate members and the chairman; determine the group's relationship to the audit committee; and prepare the charter.

We recommend that the IT governance group be made up of independent directors, as is the case with audit and compensation committees. Chairmanship is also critical. For firms in support, factory, or turnaround modes, the chairperson need not be an IT expert but should certainly be a tough-minded, IT-savvy business executive—either a CEO or a top manager who has overseen the use of IT to gain strategic advantage in another organization.

In any case, at least one person on the committee should be an IT expert who should operate as a peer at the senior management and board level ... the IT expert must have not only a solid grounding in the firm's overall business needs but also a holistic view of the organization and its systems architecture. This is particularly important if the firm chooses to outsource its functions and connect multiple vendors across a network.

We recommend that the relationship of the IT governance committee to the audit committee be very close, because IT issues can affect economic and regulatory matters such as Sarbanes-Oxley compliance. For this reason, it is a good idea to have one audit committee member serve on the IT oversight committee. The charter of the IT committee should explicitly describe its relationship to the audit group, as well as its organization, purpose, oversight responsibilities, and meeting schedule.

This is what Ernst and Young [2006] say about boards and technology governance:

As IT has become more important to the operations and success of every business, some boards have recognized IT's role in business growth and incorporated IT into the board's agenda. In many organizations, the board has taken a hands-off approach to IT, allowing the IT department or even the third parties to whom IT is outsourced to make its own decisions and to suggest new projects or programs that might benefit the business. The impact of such misalignment can be financial and lead to events which are damaging to the reputation of an organization.

Some companies are choosing to delegate board-level oversight to IT steering committees, in much the same way as they do with audit and compensation. But boards remain challenged by such issues as who should sit on these committees, what level of technology expertise is required, and how best to use the skills of other business leaders such as non-executive directors.

The board has a fiduciary responsibility to shareholders and to its organization while executive management has an operational responsibility to ensure the continuation of business in the face of systems failure, threats or attacks—all of which fall within the remit of proper IT governance.

Implementing a program of IT governance represents a challenge for organizations because of the traditionally difficult relationship between the IT department and the business. The core of the IT governance strategy should be about understanding the risks to the organization and putting procedures in place to manage them. This includes both the risks to business continuity and project risk.

According to Cash and Pearlson [2005]:



Board members feel more direct accountability for some operational aspects of the company. In the past, boards generally did not control or allocate specific corporate resources. Everything was done through executive management, with the board providing oversight. Given the mandated allocation of corporate resources—such as the new audit committee requirements to sign off on the selection of and fees for public accounting firms—boards now explicitly participate in operational decisions. This increased responsibility and accountability has precipitated a number of changes in board practices and processes.

These changes lead me to conclude that CIOs will soon be spending more time with individual board members and subcommittees, as well as in board meetings.

Lots of analysts, academics, and industry pundits believe that since technology has become so integral to business models and processes that technology governance should be elevated to the board level. There are also a (small) number of companies that have formally elevated technology to the board level.

An important exception to all this needs to be noted. Many of the companies that have technology committees on their boards of directors are technology companies. For example, HP, Cisco, Sun, and Microsoft have technology committees just like they have audit, compensation, and M&A committees. The difference is that technology company technology committees focus on corporate technology strategy—which new products to develop and market—and not on the internal use of computing and communications technology. Put another way, these committees would not look at the desirability or risk of installing an enterprise resource planning application—but they would look at investing in a new search engine to compete with Google.

The literature on business technology “alignment” published up until about 2000 calls for internally focused technology committees as the primary—if not exclusive—technology governance mechanism. Since 2000, however, there has been a shift in both the role that technology plays in business models and processes and in pressure to manage technology costs. This schizophrenia has led to a variety of perspectives especially in U.S. companies about how to operationally and strategically manage technology.

On the one hand, many U.S. companies have actually shifted reporting relationships where more CIOs and CTOs are now reporting to CFOs than was the case five years ago. This has shifted internal discussions about technology toward cost management; on the other hand, there are many companies that believe technology is both operational and strategic and that the strategic side should be managed by the CEO.

Has this filtered up to the board of directors? According to a study conducted by Burson-Marsteller [2006], the U.S. Fortune 500 has “not fully embraced the strategic importance of the roles of the chief technology officer and chief information officer—i.e., the CTO and CIO. This is reflected in the scarcity of representation at the highest reaches of authority: as CEOs and directors on corporate boards.”

The same study reports that non-U.S. companies are in fact more likely to discuss technology at the board level—“10 times more likely to have board members with CIO experience than the top 25 Fortune Global companies. In China, nearly one-fourth of the largest 25 companies have CEOs with CIO backgrounds, compared with none of the top 25 Fortune Global companies” [Burson-Marsteller 2006].

More specifically, in 2004 only 8 percent of the Fortune Global 500 companies had directors with CIO experience. Some of these companies include Electronic Data Systems (EDS), Canon, FedEx, DuPont, Office Depot, Walgreen, Aetna, Progressive, and Kmart. In addition to these companies, and as already mentioned, there are a number of technology companies that have established technology committees as part of their board structures. Some of these companies include Cisco, Novell, EDS, and HP. But our analysis of these committee charters indicates that these technology committees are much more focused on mergers, acquisitions, new technology product development, and technology branding than they are on internal technology operations, costs, or risks.

Some issues drive the addition of board members with technology experience on to corporate boards of directors. *Directors & Boards*, through its *Boardroom Briefing* publication [Spring 2006], reports that issues like business continuity and disaster recovery require technology expertise. At the same time, they report that “among Fortune 1000 companies only 15 have a current or former CIO as an external director” [Marino and Nieset 2006].

All in all, the number of U.S. companies that have elevated discussions about internal or operational technology to the board of directors level is very small—though, as the Burson-Marsteller report suggests [2006], the number is slowly increasing. The U.S. lags behind European and (especially) Asian companies in board-level discussions of technology.

We developed a survey that updates the previous findings.

We also conducted some interviews to validate the results of the survey.

II. BEST PRACTICES IN BOARD LEVEL TECHNOLOGY GOVERNANCE

We undertook a survey of technology perceptions, governance and, specifically, what companies are doing regarding board of director-level technology governance. More than 50 CIOs and CTOs responded to an online survey. Details about the questions and the demographics about the companies appear in Appendices A and B, respectively.

Table 1. Prescriptive and Descriptive Literature

Prescriptive Literature (Boards Should “Govern” Technology)	Descriptive Literature (Boards Don’t “Govern” Technology)
<p>Cash, Jim and Pearson, Keri, “The New Accountability,” <i>CIO Magazine</i>, Volume 15, Issue 15, May 15, 2005</p> <p>Cutter Consortium. (2001 - 2004). <i>Trends in the Acquisition, Deployment, Support & Management of Information Technology</i>. Arlington, MA.</p> <p>Bergstein, Mel and Sviokla, “Board Oversight,” <i>Optimize Magazine</i>, Issue 22, January 2006</p> <p>Nolan, Richard & McFarlan, Warren, “Information Technology & the Board of Directors,” <i>Harvard Business Review</i>, Volume 83, Issue 10, October 2005</p> <p>Melymuka, Kathleen, “IT and the Board,” <i>Computerworld</i>, Volume 39, Issue 42, October 17, 2005</p>	<p>Burson-Marsteller, <i>A Missing Competency: Boardroom IT Deficit</i>, 2006</p> <p>Daum, Julie., “Next Stop: The Governance Committee,” <i>Directors & Boards</i>, Spring 2003</p> <p>Gillies, Chris, “IT Governance – Are Boards and Business Executives Interested Onlookers or Committed Participants,” <i>Australian Accounting Review</i>, Volume 15, Issue 3, November 2005</p> <p>Glaser, John, “The Board’s Role in the IT Discussion,” <i>Trustee</i>, Volume 58, Issue 9, October 2005</p> <p>Moran, Pat, “IT Governance,” <i>Ernst & Young & Financial Times</i>, August 2005</p>

The descriptive literature describes the gap between technology investments and board involvement. We learn from this literature that there is not much discussion at the board level about technology investments—however large. We also learn from these articles that boards have never really played a role in technology planning or decision-making. The prescriptive literature, on the other hand, acknowledging the gap, suggests that boards should get more involved in technology matters, and suggests that involvement “pull” should come from the technology

organization, that CIOs should be proactive involving board members in technology decision-making. The prescriptive literature assumes that greater board involvement is a good thing, that the more boards understand about technology the better prepared they should be to perform their governing duties. The descriptive literature avoids these judgments.

III. THE SURVEY

Following are the survey questions.

1. How satisfied is your firm's board of directors with the return the firm is getting from its investment in IT?
2. How satisfied are your firm's professionals with the IT infrastructure and applications they have available to exploit the development of intellectual assets?
3. Do the managers at your firm perceive the cost-effectiveness of technology as high, medium, or low?
4. How would you characterize the nontechnology senior management team's awareness of technology issues and challenges?
5. How would you characterize the nontechnology senior management team's sophistication with respect to technology issues and challenges?
6. Is technology considered "tactical" or "strategic" at your firm?
7. How is the firm viewed by its management team?
8. How is your firm viewed by the investment community and industry analysts?
9. How would you characterize your firm?
10. How would you characterize the technology budget at your firm over the past three-to-five years?
11. Does your firm have in place best technology management practices?
12. How prepared is your firm to protect against denial of service attacks?
13. How prepared is your firm to protect against hackers?
14. How prepared is your firm to respond quickly to security and data protection threats?
15. Does your firm have in place management processes to ensure 24-by-7 service levels, including tested backup?
16. Is benchmarking a standard practice to ensure maintenance of your firm's competitive cost structure?
17. Are procedures in place to ensure against costly lawsuits including violations of software copyright, patents, and adherence to licensing agreements?
18. What is your corporate structure?
19. To whom does your corporate CIO report?
20. How would you describe the organization and provisioning of technology?
21. What governance structures does your firm utilize for technology?
22. How would you characterize technology governance at your firm?
23. What role does your firm's board of directors play in the governance of IT and technology?
24. Has recruitment of directors for your firm's board been influenced in any way by a desire for technology experience?
25. Is there a technology committee or sub-committee of the board?
26. How often does the CIO, or another technology executive, present to the board of directors?



27. Does the CIO, or another technology executive, communicate to the board about technology matters between board meetings?

28. Do technology vendors present to the board?

29. How long have the current board members served on your board?

IV. ANALYSIS

The analysis of the data revealed all sorts of patterns and insights. We begin with the responses to questions that relate directly to board of director involvement in technology decision-making and governance. We will then turn to the cross-tabulation of the data.¹

Responses to the first question – *What governance structures does your firm utilize for technology?* – indicates that the vast majority of companies use executive review boards (72.5 percent) or project management offices (62.7 percent) to govern technology. A very small percentage use outside advisory boards (5.9 percent).

The next question – *How would you characterize technology governance at your firm?* – revealed an amazing response: **more than 70 percent of respondents believe that their technology governance is “tight” (27 percent think their governance is “loose”).** This is surprising given the number of technology projects that fail and the political wars still fought over issues like standardization and outsourcing, among other perennial problems. Nevertheless, the finding is clear.

The next question – *What role does your firm’s board of directors play in the governance of technology?* – yielded some responses that in many respects define the state of the practice of board governance. **Only 19.6 percent of the respondents stated that their boards of directors were routinely informed about the state of technology at their companies.** 37.3 percent of their companies boards are informed about major projects and 29.4 percent are only informed about “special” projects.

The next question – *Has recruitment of directors for your firm’s board been influenced in any way by a desire for technology experience?* – suggests that the overwhelming number of companies (62.7 percent) in our survey do not regard technology experience as a prerequisite in any way to board membership. **Only 7.8 percent of the respondents indicated that their companies prefer board members with technology experience.**

The next question – *Is there a technology committee or sub-committee of the board?* – says it all: **74.5 percent of the respondents answered “no.”** 19.9 percent of the respondents answered “yes.” But the correlation of the 19 percent with the vertical industries represented in the survey indicated that companies that create, sell, and support technology are the ones that have technology sub-committees of their boards.

The next question – *How often does the CIO, or another technology executive, present to the board of directors?* – suggests that 19.6 percent of the companies invite their CIOs into the board room routinely but that 25.5 percent rarely do. 25.5 percent sometimes do and 17.6 percent do so often. These results dovetail with the findings regarding the board’s oversight of major and special technology projects, but suggest that **80 percent of board meetings are not interrupted by technology discussions.**

Does the CIO, or another technology executive, communicate to the Board about technology matters between Board meetings? is a question that exposes the depth of technology involvement the board has with technology executives and technology initiatives. The question was asked because there is frequently content with, for example, chief financial officers and audit committees of boards. **The data suggests that between-meeting-communication about technology matters is very infrequent.** Only 13.7 percent communicate between meetings and 51 percent rarely or never communicate between meetings. 9.8 percent often communicate and 25.5 percent sometimes do.

The next question directed specifically at board-level governance of technology asks *Do technology vendors present to the board?* **The data here is almost violent: over 90 percent answered “rarely” or “no.”**

The last “board question” is – *How satisfied is your firm’s board of directors with the return the firm is getting from its investment in IT?* The responses are as revealing as the other board-related questions. **Almost 90 percent of the firms believe that their board of directors is “somewhat” or “very” satisfied with technology.**

¹ The questions in the survey were multiple choice questions (see Appendix A); the demographics of the respondents appear in Appendix B.

What does the data tell us? **First, as suggested above, there is a disconnection between what technology analysts, academics, consultants, and industry pundits believe should be the way that boards of directors govern technology—and how they actually do.** Clearly, the level of board involvement in the governance of technology is low. Board members are not recruited for their technology knowledge or experience, vendors almost never present to the board, there's virtually no technology discussions between board meetings, and hardly any companies have technology committees that sit alongside audit, M&A, HR or other board committees.

The data also suggests that the majority of companies use executive review boards and project management offices—below board of director-level involvement—to govern technology. The majority also believe that they have a handle on technology governance generally, that their technology governance is “tight.”

The data suggests that in spite of increasing technology budgets (51 percent of the budgets are rising) and the strategic and tactical importance companies are placing on technology (31.4 percent say technology is “tactical,” 23.5 percent believe that it is “strategic,” and 45.1 percent believe that it is both strategic *and* tactical), there is a complacency regarding technology that is fueled part by the perception that things are generally “OK” with technology (see the data following) and that governance is pretty well in hand with existing mechanisms. Note, for example, the responses to the question, “How satisfied are your firm’s professionals with the IT infrastructure and applications they have available to exploit the development of intellectual assets?” 15.7 percent are “very satisfied” and 58.8 percent are “somewhat satisfied”; only 23.5 percent are “somewhat dissatisfied.” Related to this perception is the finding that 9.8 percent of managers perceive the cost-effectiveness of technology as “excellent” and 56.9 percent as “good.” 33.3 percent perceive it as “fair.” Significantly, none of the respondents perceived technology as “poor” or “awful.”

But what about the perceptions of non-technology senior management? The data here suggests clearly that while nontechnology senior managers may be sufficiently aware of technology, they are by no means “sophisticated” about technology issues and challenges. 35.3 percent of the respondents describe awareness as high, 39.2 percent as “medium,” and 25.5 percent as “low.” **But only 17.6 percent of respondents believe that nontechnology senior management is sophisticated about technology and 43.1 percent think they are very unsophisticated.** 39.2 percent are described as having “medium” technology sophistication.

This data suggests that as we move up the management hierarchy the awareness and sophistication of technology issues and challenges falls. (This, by the way, is confirmed by our interview data; see following).

The data also suggests that management teams perceive technology adoption as more than acceptable in their industries: 33.3 percent believe that their firms are actually leaders in their industries, and 47.1 percent believe they are average (11.8 percent admit they are “laggards”).

In response to the question, “How is your firm viewed by the investment community and industry analysts?” – 35.3 percent and 56.9 percent report that their companies are perceived as “leaders” or “average” in their industries (though only 5.9 percent admit that they are perceived as “leaders” among all industries).

Consistent with the generally positive view of technology described by most of the companies who responded to our survey, most believe that their companies guard well against technology obsolescence of hardware (90 percent), software (84 percent) and applications (66 percent), denial of service attacks (84 percent), hackers (90 percent), general security and data corruption breaches (90 percent), and even technology-related lawsuits (72 percent). Significantly, more than 62 percent of respondents report that they live in centralized technology environments, and 21.6 percent live in centralized environments with multiple lines of business. Only 21.6 percent live in truly decentralized business technology environments.

There are several contextual issues worth noting in the data.

- ✓ 49 percent of the CIOs in our survey report to the CEO (13.7 percent report to the COO and 23.5 percent to the CFO).
- ✓ 70 percent believe that their companies have ensured against IT-based surprises to senior management and the board.
- ✓ 70 percent believe that their companies have ensured against risk of IT strategic jeopardy.
- ✓ 49 percent believe that their companies exploit the discovery and execution of IT strategic opportunities, though 51 percent do not believe their companies exploit these opportunities.

- ✓ 60.8 percent believe that their companies are in “growth mode” rather than a more defensive mode where cost management contributes significantly to profit maximization (39.2 percent).

The cross-tabulation of the data also yielded useful results. We found, for example, that companies that have high confidence in their ability to manage technology and technology obsolescence tend to host more presentations to the board than at companies where technology is managed in a less disciplined way.

We noted a correlation between governance structures—review boards and project management offices primarily — and technology presentations to the board. Again, we find that the better the discipline around technology management, the more likely it is that technology presentations will occasionally be made to the board of directors.

Finally, we noted that companies that perceive their technology governance as “tight” are more likely to have board presentations about technology initiatives than companies that perceive their technology governance as “loose.”

Overall, the data revealed that companies that feel good about the way they acquire, deploy and manage technology are more likely to have board-level discussions about technology but no more likely to have board committees on technology. In fact, the better companies feel about their technology governance the less likely they are to advocate the creation of a board level committee on technology.

We detected very little difference among the company categories, vertical industries or size, among other variables. In fact, the differences across the groups were so minimal that we concluded that the gap between board involvement and technology decision-making was ubiquitous—regardless of the industry or market share. With the exception of the aforementioned technology companies (that have new product technology subcommittees), the entire sample of companies behaved pretty much the same way regarding governance through their boards of directors.

This question of governance is in itself provocative, since the industry assumes that strong governance yields cost-effective technology investments while weak governance yields poor investments. Strong governance is an end unto itself in many organizations which assume that governance will protect them from investment mistakes. Strong governance often provides rationale for technology investment strategies. While it is true that strong governance often correlates with investment prudence, it by no means guarantees success. Perhaps the irony here is that companies with weak governance below the board level could probably benefit from board involvement while companies with strong governance might see only marginal returns from board involvement.

Governance itself is different across decision-making levels. Strategic governance includes decision-making around the overall business technology strategy and technology alignment with the business. Operational or tactical governance includes decision-making around the acquisition, deployment and support of computing and communications technology. The “rules” around strategic and operational technology are implemented differently by different parts of the organization.

V. INTERVIEWS

In addition to the online survey we also conducted interviews with the CIOs, CTOs and senior technology executives willing to spend some time clarifying their responses. The results of the interviews were completely consistent with the analysis of the survey data.

The interviews were organized around a series of questions deigned to probe the responses from the survey. The responses suggest a clear pattern (which is consistent with the data we collected from the online survey). The paraphrased responses to the questions appear below, followed by detail for from specific CIOs and CTOs.

Questions and Paraphrased Responses

- “Our survey data indicated that relatively few companies have technology committees. Why do you think that so few companies have technology committees of their boards of directors? What do you think the real reasons are?”
 - ⇒ The politics of board activity is complicated and brutal—there would have to be major political pressure on the board for a technology committee to be created ...
 - ⇒ There’s relatively little interest in technology at the board level ...
 - ⇒ The board is already too busy—with compliance problems—to take on another task ...



- ⇒ No one has enough confidence about technology problems to deal with them directly ...
- ⇒ The chairman and CEO are happy to *not* discuss technology with the board ...
- “Our data indicated that there’s confidence in how companies are acquiring, deploying, and supporting technology. Do you feel that way? Do you think that some of the issues should receive board-level attention?”
 - ⇒ We’ve gotten pretty good at running infrastructures and infrastructure management is the last thing we want to talk to boards about ...
 - ⇒ Hardware, software, and communications are becoming more and more like commodities—which makes it easier to run technology organizations ...
 - ⇒ The board should not be involved with anything involving technology infrastructure or basic technology systems ...
 - ⇒ Technology support is getting better and better; there’s no reason to bother the board with this stuff ...
- “What do you think the board’s perfect role might be regarding technology?”
 - ⇒ Boards should be told about major technology projects ...
 - ⇒ Boards should be told about major technology problems ...
 - ⇒ A board committee might be formed if the company’s strategy depended on technology and there were lots of big technology projects ...
 - ⇒ The board might be able to help companies with major technology orders through their contacts with vendors ...
 - ⇒ The board could keep the company honest on its compliance and regulatory problems in so much as technology is involved ...
 - ⇒ The board should be involved in disaster recovery issues ...
- “What do you think the biggest obstacles are to board involvement in technology strategy?”
 - ⇒ Lack of interest ...
 - ⇒ Lack of understanding of technology problems ...
 - ⇒ Lack of time ...
 - ⇒ Technology is not as important as mergers, acquisitions, or compensation
 - ⇒ The only committee we need is the audit committee ...
 - ⇒ We have technologists for technology ...
 - ⇒ Technology projects go on for years—boards have no patience in long-term projects ...
 - ⇒ There’s no relationship between technology and profitability and therefore compensation ...
 - ⇒ Politics, politics, and politics ...
- “Do you think that a board committee on technology would significantly improve technology decision-making or do you think that given all of the obstacles and constraints it might actually hurt the process?”
 - ⇒ A board committee would have limited impact ...

- ⇒ If the board really wanted to dig into technology issues it could help a lot ...
- ⇒ If the board really understood technology it could contribute ...
- ⇒ Only if it stuck to technology strategy—not operations ...
- ⇒ Not clear what the ROI would be on a board technology committee ...
- ⇒ Occasionally ...

CIO and CTO Responses

“We’re a government agency but we do have an external board of directors. The problem is that they are old. The average age of the board is 70. They do not understand technology or what it could do for the agency. They are bored by technology discussions. I have presented to them twice in five years and only on matters that involve financial reporting systems and organization risk.

“There are other ways that technology is governed in the agency. There is an internal oversight committee that meets once a year to establish priorities for the agency. Technology projects are part of the process. But over the years technology projects have not fared so well. While everyone knows that technology is important there always seem to be other projects that are at the end of the day considered more important. But we get the chance to sell technology projects to this board which actually does understand technology. It is probably best that the external board is unfamiliar with and disinterested in technology.”

CIO of a Large U.S. Government Agency

“When I was offered this job I insisted that the CIO report to the CEO—or President, in this case. For many years, the CIO position reported several layers below the boss. But I got my wish and technology is now discussed in the management team on a regular basis. But it is rarely discussed at the board of directors level. After getting my way and raising technology’s profile in the organization, I am now happy to have the visibility stop right where it’s at. The board of directors would not be a good partner. It is far too detached from operations or even—really—strategy. They are interested in security, compliance, finance and fund-raising and the role that they expect technology to play – without ever talking about technology. They do not care about any of the specifics. I present to them when there is a major initiative that falls within the purview of their existing responsibilities, but I make real sure not to talk about technology. The biggest obstacles to board involvement in technology strategy include the lack of recognition regarding the importance of technology or the strategic positioning of IT within the organization. In short, board members’ ‘knowledge of technology’ or lack thereof.

CIO of a Major U.S. University

“I am the CIO of a technology company. We are struggling a little at the moment so there is pressure to run as lean a shop as possible. I am really the Chief Infrastructure Officer more than the Chief Information Officer. Our board has a technology committee but it focuses on new products and services we can sell to clients. It never focuses on internal technologies. These are considered part of doing business, not the business. I do not present to the board. I do not attend board meetings. The board has mostly sales and marketing people on it. There are no CIO types on the board, though there are people who have built technology companies.

“We have a lot of internal technology governance. We have committees that look at all technology projects. The ROI must be strong for a project to get approved. We are all about good business cases. We have adopted the COBIT framework for infrastructure performance management. We are outsourcing more and more technology. We are good at cutting cost. We are good project managers. We don’t waste money. I don’t think we need any more technology governance. In a perfect world, I would tell you about where internal and external technology should meet. But that’s not likely to happen since we’re pretty comfortable in our silos.”

CIO of Large Global Technology Company



“We are a public company so any large technology projects must be disclosed to our shareholders. We recently implemented SAP’s R/3. It was a 36-month project that cost over \$300 million dollars. The project went well, and the analysts that cover the company asked questions about the project nearly every conference call by the CEO and the senior management team. Had the project failed there would have been hell to pay. With all of this visibility it had to succeed. The board of directors was briefed on the project at every meeting. I made some of those presentations along side the CEO. These presentations were short and sweet. Generally good questions were asked about the project. There were occasionally not-so-good questions. But the board I guess was technically part of the process.

“There is no technology committee of the board. Technology is still seen as more tactical than strategic. This I think explains why there is no technology committee. If technology was regarded as strategic to the company then I think there would be a technology committee. If you ask me, I think that technology is becoming more and more strategic, but the company’s and the board’s appreciation of this is lagging reality. The amount of effort it would take to get them all up to speed would probably be disproportionate to what they could contribute. Board involvement probably only works when everyone is on the same page regarding technology’s role at the company. It also helps when individual board members actually have some understanding of technology.”

CIO of a Global Chemicals Company

“We formed a Technology Advisory Board (TAB). This board is supposed to look at technology strategically—two to three years out. It is a strategic governance group, made up of internal executives and consultants. It meets four times a year. It is separate from the board of directors which does not have a technology committee.

“The TAB is external and influential. It is complemented by an executive committee that reviews technology investment proposals every year. We are doing OK with this structure. We have an internal committee and an external TAB. But again, the board of directors of the company does not review technology projects and I think it probably should not do so. Most of the board members know a lot about real estate and mortgages but hardly anything about technology.

“This is all more interesting because we know that nearly 90 percent of all homebuyers begin their home search on the Web. We also know that the handling of eLeads will become core to all real estate companies in the next few years. We also know that mortgage transaction processing is become more integrated and that the impact of broadband wireless communications technology will be huge in the business – already is. Maybe said a little differently, technology will be the single biggest source of change in the real estate industry over the next 10 years. So why don’t I want a board committee on technology? It’s just not necessary. We have two groups that look at technology projects all the time and since board members don’t know anything about technology it would be torture to work technology issues though a board technology committee.”

CIO of a Large Real Estate and Mortgage Brokerage

“Most BOD members are older and less experienced with technology. Few feel competent to assess technical issues and most only know about IT disasters (the popular press).

“I am confident that our company is doing well deploying and supporting technology. Most companies do struggle with the deployment of appropriate and effective technology. I think the BOD should review the value of proposed technology investments and provide thought partnership to the business regarding corporate strategy and IT strategy alignment. But overall, there’s a lack of IT savvy among board members.

“I think the board should be reviewing IT strategy and corporate strategy alignment, IT investments and IT performance. I do not think the board should be involved in reviewing technology per se. I would not call it a committee on technology. I would call it technology strategy and investment oversight committee or something similar. Asking non-technical people to be on a technology committee would be a disaster.”

CIO of Midwest US Energy Company

“Technology decisions are not as difficult as they were in the past. Many of the more visible new technologies have brought incremental improvements, but nothing really transformational. Those that have potential (e.g., RFID) often have difficulty gaining traction due to the complexity of changing business processes.

“Any fully qualified professional in a given domain should understand what the trends in technology are that could positively impact their business. The question is the willingness of the user to modify their business to take advantage of these technologies.

“In a large multinational company, as in pharmaceuticals, there are vast difference between, R&D, marketing, industrial operations, etc. and therefore few opportunities to leverage a corporate level technology committee.

“I have confidence in our processes. Technologies are evaluated for business relevance, potential benefits to the business, and cost of ownership. Very little would be gained by Board level oversight, and it would probably be a waste of the board’s time.

“A perfect role for the board would be support for funding and commitment to drive organizational change for recommended new technologies.

“The biggest obstacle to board involvement? Lack of understanding or interest. Another board committee would just add bureaucracy.”

CIO of a Large Global Pharmaceutical Company

These comments suggest several things. First, it was noted by several of the technology executives that directors are often old, disinterested in technology, and sitting on boards because of personal relationships not because of their technology (or even other) expertise. The comments also suggest that many CIOs and CTOs believe that they have their hands tightly gripped on the technology controls and that, by implication, they really do not need any additional help—especially from directors with the aforementioned characteristics. They are afraid of adding more bureaucracy. They think there may be a role for directors to discuss who governs technology and business technology alignment at the highest levels but not to examine specific technology investments. Overall, it is safe to say that the gap between technology and boards of directors is wide and deep, and there is not a great deal of excitement on the part of CIOs and CTOs to close the gap.²

VI. RECOMMENDATIONS

Figure 1 suggests that there’s been a shift in the relationship over time and that business technology leadership has become more business- than technology-focused. Business knowledge and experience is now more important than technology knowledge and experience. This change in the relative importance of business and technology and the leadership requirements it assumes will define the role that technology plays in overall corporate strategy. This, in turn, is likely to increase the visibility of technology at the board level—but not as quickly as some might expect or advocate. There is a lag effect at work here and even though technology is becoming more and more important to just about every company on the planet, it will take some time for technology issues, problems and opportunities to become mainstays of boards of directors. There’s a context in which we can interpret our interview and survey data—and frame some of recommendations. Luftman [2000, 2004] offers a business technology alignment maturity model that can help optimize the business technology relationship as it includes CIOs, CEOs, CFOs and boards of directors. Figure 2 presents the form and substance of the relationship that our analysis suggests is necessary to optimize technology investments. The building blocks are flanked by Luftman’s six alignment maturity criteria.

Companies that see technology as both operational *and* strategic, and spend upwards of 5 percent or more of their gross revenues on technology should consider elevating technology discussions to the board level. Figure 2 suggests that the role that technology should play at the board level involves five layers and some maturity context (provided by Luftman).

² We did not talk with nontechnology executives regarding these issues. It is quite possible that a different perspective would emerge from such conversations. We plan to visit nontechnology (business) managers and executives as a follow-up to this research.

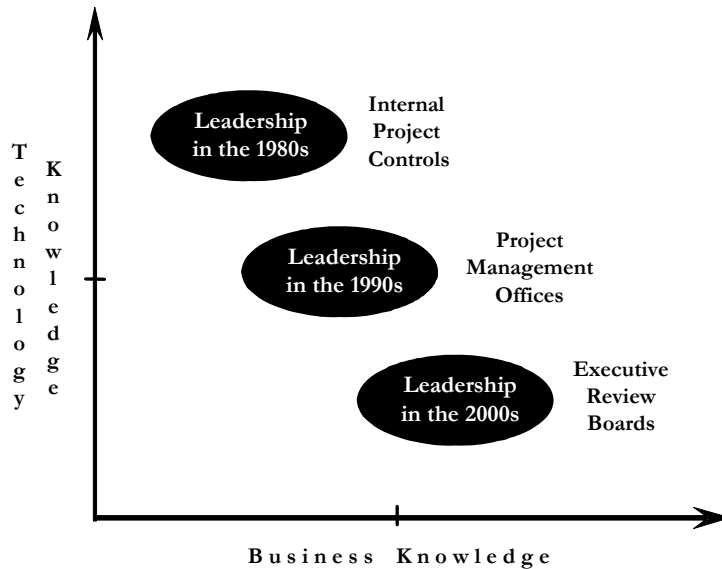


Figure 1. The Changing Business Technology Relationship

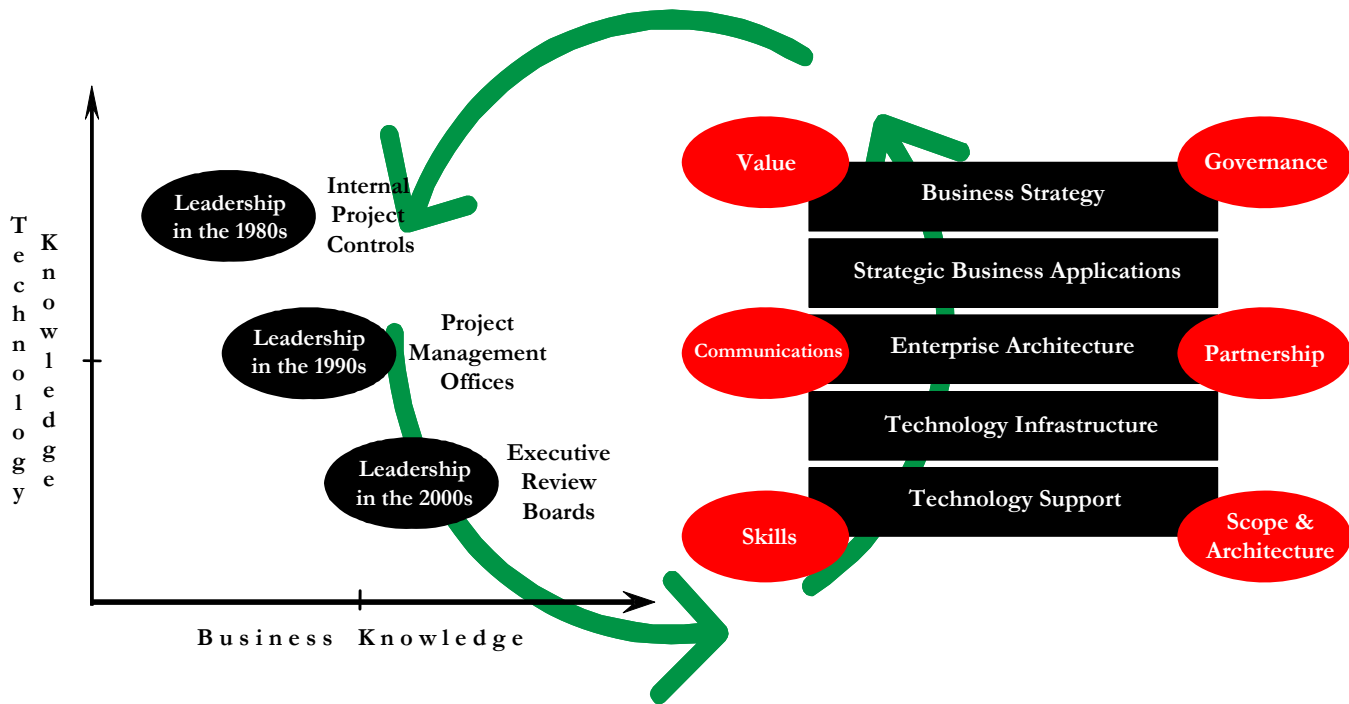


Figure 2. The Changing Business Technology Relationship

Let us look at the issues, challenges and opportunities that boards should discuss organized around the five levels and context of business technology in Figure 2. These recommendations extend directly from the data we collected—and help us move from the descriptive to the prescriptive.

Board Technology Issues, Challenges, and Opportunities

Level #1: Business Strategy

Boards should look for relationships between business strategies and technology requirements. For example, boards should understand the relationship between the desire for more e-business and the need for additional bandwidth, security, and Web analytics. Boards should guard against strategic business initiatives and technology disconnections; they should also be aware of the cost implications of fulfilling the requirements of new business

models and processes. Boards should also inspect the organization of technology in their companies. All of these activities should be routinized through formal communications and review processes led by the CIO and CTO, among other executives.

Level #2: Strategic Business Applications

Boards should be aware of major applications that the company plans to acquire or rent, especially applications that will change the way the company does business or applications that have large capital expenditure implications, such as customer relationship management (CRM), enterprise relationship planning (ERP), and network and systems management frameworks. Boards should also consider the source of strategic business applications: should the enterprise, the lines of business or outside vendors provide these applications? These are core issues.

Level #3: Enterprise Business Technology Architecture

Boards should discuss the general alignment of the overall “as is” and “to be” business strategy (and the strategic applications that support the strategy), and the overall technology acquisition, deployment and support strategy for the company. Especially important is current versus future technology capabilities and technology gaps that could develop if the business model outstrips the company’s technology infrastructure.

Level #4: Technology Infrastructure

Boards should discuss the technology infrastructure especially its security, its ability to comply with regulations and audit requirements, its communications capabilities, and its general operational efficiency. Boards should receive scorecards on how well the infrastructure is performing over time and with reference to its competitors in the industry. Major infrastructure investments should be vetted with the board—especially given the importance of infrastructure to security, compliance, and online transaction processing.

Level #5: Technology Support

Boards should discuss the whole question of sourcing—often and in-depth. Why? Because sourcing speaks directly to core competencies: should the company in-source, co-source or out-source its technology support? Should it in-source, co-source, or outsource business processes? What levels of support are required? High on the list for board review is disaster recovery and business resumption planning. What level of support in these (and related) areas is necessary, acceptable, and cost-effective? These are all board issues.

Alignment Maturity Criteria

Communications

“Effective exchange of ideas and a clear understanding of what it takes to ensure successful strategies are high on the list of enablers and inhibitors to alignment. Too often there is little business awareness on the part of IT or little IT appreciation on the part of the business. Given the dynamic environment in which most organizations find themselves, ensuring ongoing knowledge sharing across organizations is paramount. Many firms choose to draw on liaisons to facilitate this knowledge sharing. The key word here is facilitate” [Luftman 2000].

Boards of directors should become part of the communications process and members of the communications circle. Our research indicates that directors do not receive routine communications about technology initiatives. In order to engage them in especially the strategic aspects of technology, the communications channel to board members should be proactively widened by CIOs and CTOs with the support of nontechnology executives.

Competency/Value Measurements

“Too many IT organizations cannot demonstrate their value to the business in terms that the business understands. Frequently business and IT metrics of value differ. A balanced “dashboard” that demonstrates the value of IT in terms of contribution to the business is needed. Service levels that assess IT’s commitments to the business often help; however, the service levels have to be expressed in terms that the business understands and accepts. The service levels should be tied to criteria that clearly define the rewards and penalties for surpassing or missing the objectives” [Luftman 2000].

Board-level metrics should be developed and tracked by boards of directors. Such metrics should speak directly to board-level concerns such as growth, revenue, cost management, globalization and differentiation, among other areas of concern. The details of conventional SLAs should not become the focus of board discussion or involvement; instead, the focus should be on “big” metrics.

Governance

“Ensuring that the appropriate business and IT participants formally discuss and review the priorities and allocation of IT resources is among the most important enablers/inhibitors of alignment. This decision-making authority needs to be clearly defined” [Luftman 2000].

Rules need to be discussed among the executive leadership of the companies and the board of directors about the acquisition, deployment and support of computing and communications technology at a high level of abstraction. This means that boards need to understand their role in the acquisition/deployment/ support process—not the project or even program rules that govern all technology spending. Boards need to understand where their role begins and ends, and how major projects are prioritized, implemented, and assessed.

Partnership

“Too many IT organizations cannot demonstrate their value to the business in terms that the business understands. Frequently business and IT metrics of value differ. A balanced ‘dashboard’ that demonstrates the value of IT in terms of contribution to the business is needed. Giving the IT function the opportunity to have an equal role in defining business strategies is obviously important. However, how each organization perceives the contribution of the other, the trust that develops among the participants, ensuring appropriate business sponsors and champions of IT endeavors, and the sharing of risks and rewards are all major contributors to mature alignment. This partnership should evolve to a point where IT both enables *and* drives changes to both business processes and strategies” [Luftman 2000].

Boards of directors should receive communications that are in business terms and speak directly to business value. A “dashboard” or “scorecard” from meeting to meeting is a way to keep the board apprised of progress, issues, opportunities, and threats. This requires an investment over time: it will not happen over night.

Scope and Architecture

“This set of criteria tends to assess information technology maturity. The extent to which IT is able to:

1. Go beyond the back office and the front office of the organization;
2. Assume a role supporting a flexible infrastructure that is transparent to all business partners and customers;
3. Evaluate and apply emerging technologies effectively;
4. Enable or drive business processes and strategies as a true standard;
5. Provide solutions customizable to customer needs” [Luftman 2000].

Boards should understand the relationship between business processes and enabling technology; they should understand technology trends; and they should understand how technology investments affect their company’s ability to adapt, service, distribute, and innovate.

Skills

“Skills include all of the human resource considerations for the organization. Going beyond the traditional considerations such as training, salary, performance feedback, and career opportunities, are factors that include the organization’s cultural and social environment. Is the organization ready for change in this dynamic environment? Do individuals feel personally responsible for business innovation? Can individuals and organizations learn quickly from their experience? Does the organization leverage innovative ideas and the spirit of entrepreneurship? These are some of the important conditions of mature organizations” [Luftman 2000].

Boards of directors should focus on human capital development and how the corporate culture enables or inhibits progress. This is a core competency for boards.

VII. CONCLUSIONS

This paper describes the state of the practice of technology governance through boards of directors. We reviewed the literature, conducted a survey and interviews, and then interpreted the findings. Based on the findings, we also developed a set of recommendations for board-level technology governance.

The *prescriptive* literature suggests that it’s time for boards to assume meaningful oversight of technology investments and strategies. The *descriptive* literature suggests that there is relatively little board involvement in technology planning or oversight. The survey data that we collected (and the interviews that we conducted) supports the descriptive literature: There is relatively little board involvement in technology planning or oversight. Further, many CIOs who have otherwise well-organized technology at their companies do not believe that board of directors oversight will improve technology optimization.

This is a pivotal time in the evolution of technology governance. Technology is simultaneously becoming commoditized *and* strategic. The cost keeps rising as well, with many companies now spending 5 percent or more of their annual gross revenue on technology. While the majority of companies still use technology review boards and project management offices to govern technology (that govern well below boards of directors), many companies whose technology budgets are growing and whose perception of technology is more strategic than operational will move technology up the governance hierarchy to the board level. The economic crisis in which we find ourselves today adds another layer of complexity to technology optimization. The pressure to reduce costs while still improving service will be brutal in the upcoming years. Will additional governance be required? Will there be pressure to add boards of directors to the governance process? Time will tell, but it is likely that additional governance will be applied to technology decision-making—especially large technology capital expenditure (CAPEX) projects.

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APPENDIX A: SURVEY QUESTIONS

How satisfied is your firm's board of directors with the return the firm is getting from its investment in IT?

- ⇒ Very Satisfied
- ⇒ Somewhat Satisfied
- ⇒ Somewhat Dissatisfied
- ⇒ Very Dissatisfied

How satisfied are your firm's professionals with the IT infrastructure and applications they have available to exploit the development of intellectual assets?

- ⇒ Very Satisfied
- ⇒ Somewhat Satisfied
- ⇒ Somewhat Dissatisfied
- ⇒ Very Dissatisfied

Managers at your firm perceive the cost-effectiveness of technology as:

- ⇒ Excellent
- ⇒ Good
- ⇒ Fair
- ⇒ Poor
- ⇒ Awful

How would you characterize the nontechnology senior management team's *awareness* of technology issues and challenges?

- ⇒ High
- ⇒ Medium
- ⇒ Low

How would you characterize the nontechnology senior management team's *sophistication* with respect to technology issues and challenges?

- ⇒ High
- ⇒ Medium
- ⇒ Low

Is technology considered "tactical" or "strategic" at your firm?

- ⇒ Tactical
- ⇒ Strategic
- ⇒ Both

How is the firm viewed by its management team?

- ⇒ Leader in technology adoption among firms in all industries
- ⇒ Leader in technology adoption among firms in the industry
- ⇒ Average in technology adoption among firms in the industry
- ⇒ Laggard in technology adoption among firms in the industry



How is your firm viewed by the investment community and industry analysts?

- ⇒ Leader in technology adoption among firms in all industries
- ⇒ Leader in technology adoption among firms in the industry
- ⇒ Average in technology adoption among firms in the industry
- ⇒ Laggard in technology adoption among firms in the industry

How would you characterize your firm?

- ⇒ Focused on growth investing
- ⇒ Focused on profit maximization keeping costs to a minimum

How would you characterize the technology budget at your firm over the past three-to-five years?

- ⇒ Rising
- ⇒ Falling
- ⇒ Remaining flat/increasing only by inflation

Does your firm have in place the management practices to:

Yes/No

- ⇒ Guard against the obsolescence of it hardware
- ⇒ Guard against the obsolescence of it software
- ⇒ Guard against the obsolescence of applications
- ⇒ Ensure against IT-based surprises to senior management and the board
- ⇒ Ensure against risk of IT strategic jeopardy
- ⇒ Exploit dscovery and execution of IT strategic opportunities

How prepared is your firm to protect against denial of service attacks?

- ⇒ Very prepared
- ⇒ Somewhat prepared and working to improve
- ⇒ Somewhat prepared with no plan to improve
- ⇒ Not prepared but working to improve
- ⇒ Not prepared with no plan in place to improve

How prepared is your firm to protect against hackers?

- ⇒ Very prepared
- ⇒ Somewhat prepared and working to improve
- ⇒ Somewhat prepared with no plan to improve
- ⇒ Not prepared but working to improve
- ⇒ Not prepared with no plan in place to improve

How prepared is your firm to respond quickly to security and data protection threats?

- ⇒ Very prepared
- ⇒ Somewhat prepared and working to improve
- ⇒ Somewhat prepared with no plan to improve
- ⇒ Not prepared but working to improve
- ⇒ Not prepared with no plan in place to improve



Does your firm have in place management processes to ensure 24-by-7 service levels including tested backup?

- ⇒ Yes
- ⇒ No
- ⇒ Don't know

Is benchmarking a standard practice to ensure maintenance of your firm's competitive cost structure?

- ⇒ Yes
- ⇒ No
- ⇒ Don't know

Are procedures in place to ensure against costly lawsuits including violations of software copyright, patents, and adherence to licensing agreements?

- ⇒ Yes
- ⇒ No
- ⇒ Don't know

What is your corporate structure?

- ⇒ Centralized, one line of business
- ⇒ Centralized, multiple lines of business
- ⇒ Decentralized, multiple lines of business

To whom does your corporate CIO report?

- ⇒ CEO
- ⇒ COO
- ⇒ CFO
- ⇒ Other (Please Specify)

How would you describe the organization and provisioning of technology?

- ⇒ Centralized
- ⇒ Decentralized
- ⇒ Centralized infrastructure but decentralized applications and divisional systems
- ⇒ Other (Please specify)

What governance structures does your firm utilize for technology? (Please check all that apply.)

- ⇒ Executive review boards
- ⇒ Project management office
- ⇒ Outside advisory boards
- ⇒ Combination of the above
- ⇒ Other (Please specify)

How would you characterize technology governance at your firm?

- ⇒ Tight
- ⇒ Loose
- ⇒ None

What role does your firm's board of directors play in the governance of IT and technology?

- ⇒ Routinely informed about the state of technology at the firm
- ⇒ Routinely informed about important and/or large technology projects
- ⇒ Only informed about "special" technology projects
- ⇒ Only informed about technology projects when they are in trouble
- ⇒ Infrequently informed about technology projects or performance
- ⇒ Rarely informed about technology projects or performance

Has recruitment of directors for your firm's board been influenced in any way by a desire for technology experience?

- ⇒ Yes
- ⇒ Somewhat
- ⇒ No
- ⇒ Don't know

Is there a technology committee or sub-committee of the board?

- ⇒ Yes
- ⇒ No
- ⇒ No, but planning to create

How often does the CIO, or another technology executive, present to the board of directors?

- ⇒ Routinely
- ⇒ Often
- ⇒ Sometimes
- ⇒ Seldom
- ⇒ Never

Does the CIO, or another technology executive, communicate to the board about technology matters between board meetings?

- ⇒ Routinely
- ⇒ Often
- ⇒ Sometimes
- ⇒ Seldom
- ⇒ Never

Do technology vendors present to the board?

- ⇒ Routinely
- ⇒ Often
- ⇒ Sometimes
- ⇒ Seldom
- ⇒ Never

How long have the current board members served on your board?

- ⇒ One year or less
- ⇒ One to five years
- ⇒ More than five years
- ⇒ Don't know

APPENDIX B: SURVEY DEMOGRAPHICS

Ownership

⇒ Publicly Owned	66.7%
⇒ Privately Owned	33.3%

Size of Technology Budget

⇒ Less Than \$5M per Year	11.8%
⇒ More Than \$5M to \$10M per Year	9.8%
⇒ More Than \$10 to \$25M per Year	21.6%
⇒ More Than \$25M to \$100M per Year	17.6%
⇒ More Than \$100M to \$500M per Year	19.6%
⇒ More Than \$500M per Year	19.6%

of IT Professionals

⇒ 1 – 9	3.9%
⇒ 10 – 19	3.9%
⇒ 20 – 49	5.9%
⇒ 50 – 99	23.5%
⇒ 100 – 499	31.4%
⇒ 500 – 999	9.8%
⇒ More Than 1000	21.6%

Vertical Industries

⇒ Manufacturing	21.6%
⇒ Financial Services	27.5%
⇒ Insurance	2%
⇒ Chemicals	5.9%
⇒ Retail	13.7%
⇒ Technology	11.8%
⇒ Pharmaceutical	7.8%
⇒ Other	9.8%

Location of Corporate Headquarters

⇒ North America	56.9%
⇒ Europe	27.5%
⇒ Middle East	15.7%

Respondent Titles

⇒ CEO	5.9%
⇒ CFO	3.9%
⇒ Corporate CIO	54.9%
⇒ Divisional CIO	19.6%
⇒ Corporate CTO	2%
⇒ Divisional CTO	3.9%
⇒ Other	9.8%



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