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Stephen J. Andriole

Villanova University, stephen.andriole@villanova.edu

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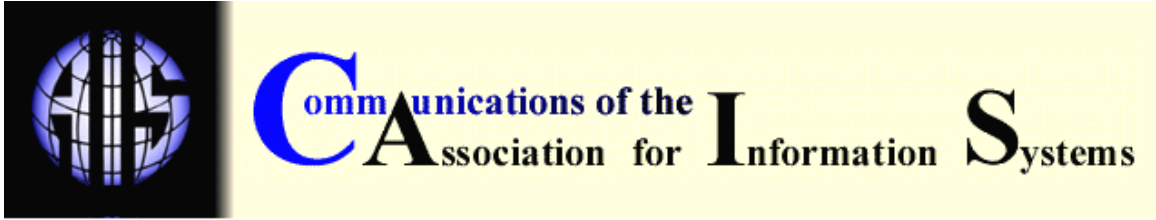
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MINING FOR DIGITAL GOLD: TECHNOLOGY DUE DILIGENCE FOR CIOs

Stephen J. Andriole
 Thomas G. Labrecque Professor of Business Technology
 Department of Decision & Information Technologies
 Villanova School of Business
 Villanova University
stephen.andriole@villanova.edu

ABSTRACT

How do CIOs decide which technologies to acquire and deploy? This paper presents a set of criteria used by CIOs to vet technology decisions and spread their technology bets. There is insight to be gained by defining, understanding, and applying these criteria. In fact, the more we understand the technology due diligence process the better our understanding of technology leverage becomes. Ultimately, the practice of solid due diligence processes is about the optimization of business technology.

There are at least 15 criteria used by Chief Information Officers (CIOs) to perform due diligence on prospective technology investments. This paper describes these criteria and prescribes how they should be applied to technology investment decisions. CIOs benefit from a disciplined due diligence process; technology vendors also benefit since investment decision-making becomes repeatable and predictable – and therefore more manageable; and those who analyze technology decision-making benefit from disciplined due diligence which enables a systematic analysis of the drivers of technology acquisition and deployment, as well as the development of due diligence effectiveness metrics.

I. INTRODUCTION

“Due diligence is a term used for a number of concepts involving either the performance of an investigation of a business or person, or the performance of an act with a certain [standard of care](#). It can be a legal obligation, but the term more commonly applies to voluntary investigations.”¹ *Technology* due diligence refers to the process by which alternative technologies and technology services are vetted. Some organizations and CIOs are disciplined in the way they assess alternative technologies and technology services, while others are not so organized. In a perfect world, every technology investment decision is made with complete information gathered by a team of experienced due diligence professionals. In the real world, the due diligence process is often rushed, plagued by the unavailability of information and conducted by people who have limited experience – all the more reason for discipline. Most of the prescriptive research on due diligence applies more to mergers and acquisitions [Gordon 1996; Harvey and Lusch 1995; Lajoux 2000; Perry and Herd 2004], portfolio management [Weill and

¹ Wikipedia

Aral 2006] and macro trends in business technology [Andriole 2005]. Some analyses have been applied to venture capital due diligence [Camp 2002; McGrath, Gunther, Keil and Tukiainen 2006], and some in the much larger context of business technology alignment [Prahalad and Krishnan 2002]. Very few analysts have focused on technology due diligence from the perspective of CIOs.

Effective CIOs use due diligence criteria to vet ideas. There is generally more discipline surrounding the application and creation of technology than we find, for example, in venture investing. This is because CIOs are expected to make the right decisions most of the time. They are consequently more careful about how they spend their firms' money, especially because if they are wrong too often, they will lose their jobs.²

The paper begins with an overview of due diligence and then describes the fifteen due diligence criteria in detail. Due diligence best practices are then described in a methodology that CIOs can practice to improve their technology investment effectiveness. The paper ends with a discussion of how the role of technology has changed over time and how due diligence discipline supports technology's new role as both a cost manager and revenue generator.

II. DUE DILIGENCE CRITERIA

There are at least 15 due diligence criteria that help CIOs make better technology investment decisions. These criteria frame due diligence processes. Depending on the opportunity and the investment perspective, some are more important than others. Some yield information more readily than others. Some are potentially dangerous – like when the due diligence team falls in love with the management team for all the wrong reasons – and some are harder to quantify than others. The 15 criteria can help organize decisions around what to invest in, how to invest, and what return on investment (ROI) expectations are reasonable. The 15 criteria are discussed following.

1. THE “RIGHT” TECHNOLOGY

The "right" technology assumes that the technology product or technology service is productive today – and likely to remain so. It assumes that the technology “works,” and is capable of scaling. It assumes that the technology service is consistent with requirements, can scale, and is reliable. It assumes that the technology is secure. It assumes that the technology is part of a larger trend, such as the development of wider and deeper enterprise applications, like enterprise resource planning (ERP) platforms. It assumes that the adoption of the technology will grow. It assumes that the foundation of the technology and technology service reflects larger digital progress. CIOs need to make sure that the applications, communications, database, infrastructure, or support technology is consistent with the general directions of the field, what their competitors are doing and with cost management best practices.

But there's another dimension to “right.” Technologies can be segmented into concepts – ideas (like the semantic Web), emerging prototype technologies (like Web 2.0), and technology clusters that include tested technologies plus infrastructure, applications, data, standards, a developer community, and management support – like what we find with ERP platforms. Technology impact is related to concepts, prototype technologies and clusters; concepts are wannabes, prototype technologies have potential and mature technology clusters are likely to have huge sustained impact on business.

² Venture capitalists will typically assume more risk than CIOs. Vendors, like CIOs, are careful, since whole new product lines are expensive to develop and field: the last thing they want to do is invest in a new software application that no one wants to use or one that the competition has released six months before the company's release date.

The essence of all this is that technologies and technology services will have limited impact until full clusters develop around them consisting of all of the things necessary for technologies to grow, all of the applications, data, support, standards, and developers that keep technologies alive and well over long periods of time. Figure 1 suggests that it is too early to tell if many of the technologies to watch will become high impact technologies, that is, will cross

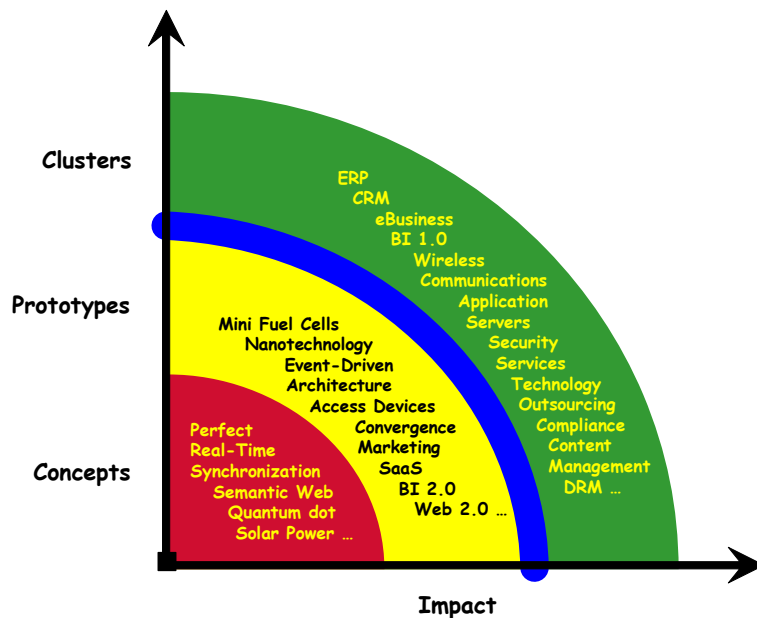


Figure 1. Technologies, Impact and the Chasm

the chasm. Real-time synchronization and the semantic Web, among others, may or may not yield successful prototypes – which may or may not evolve into full-blown clusters. CIOs prefer to invest in technology clusters and – through good due diligence – bet on the prototype technologies and technology service models most likely to cross the chasm to become clusters.

2. FEW OR NO INFRASTRUCTURE REQUIREMENTS

Technology solutions that require large investments in existing communications and computing infrastructures - like more powerful laptops or more bandwidth - are more difficult to sell internally and deploy than those that ride on existing infrastructures. If technology managers have to spend lots more money to apply a company's product or service, they are less likely to do so - if the choice is another similar product or service that requires little or no additional investments.

For example, to implement Oracle's enterprise financial system, users have to first install the Oracle data base engine. If the user's current data base management platform is IBM's DB2 or Microsoft's SQL Server, then the move to Oracle is likely to be complicated and expensive. It is obviously harder to deploy a technology that requires additional technology investments than one that requires relatively little infrastructure modifications. Other examples include the need for greater bandwidth to accommodate additional video processing, or the need to buy all new mobile computing equipment to support a new – but unproven – remote access customer relationship management (CRM) strategy.

CIOs are incredibly sensitive to the law of unintended consequences: if an investment chain reaction is suspected as a result of a new technology investment the investment will be avoided. Infrastructure requirements analyses are conducted by CIOs to determine what the real cost of a technology will be since infrastructure costs can skyrocket if a prospective technology requires additional computing or communications power otherwise unaccounted for in the technology itself and, worse, is unsupported by the existing infrastructure.

3. BUDGET CYCLE ALIGNMENT

It is easier to sell into a new or growing budget cycle than into an older or shrinking one. As sales professionals have known for years, it is difficult to sell at the end of the fiscal year. In order to make sales in November or December one must get creative, often offering to – in effect – defer billing until budgets get renewed. Another aspect of the budget cycle worth noting is the identification of "protected" budget lines, the lines for products and services that just about everyone agrees they need. Today, Sarbanes-Oxley compliance projects are often considered "protected." In the late 1990s the protected projects were Y2K software remediation and e-business projects.

Capital markets drive spending which in turn determines the market for "vitamin pills" and "pain killers." As Figure 2 suggests, both drivers are on a continuum. Bear markets kill technology (and other) spending. Bull markets make companies lose their heads and buy just about everything they see. Vendors of course hate bear markets – but buyers should love them. Pain killers include those investments that reduce costs and increase efficiency. They're usually made under duress: someone decides that an investment has to be made before some huge technology problem arises. It is usually the CIO who holds the gun to the CFO's head.

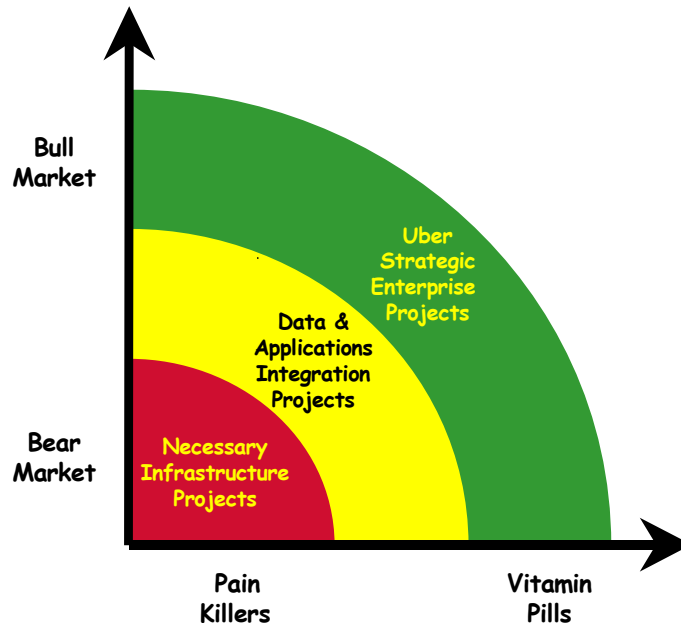


Figure 2. Investment Drivers

Vitamin pills – those technologies that completely transform business – are the elixirs of bull markets. Bull markets breed silver bullets and disruptive technologies: CIOs appreciate the capital context of their technology investments.

4. QUANTITATIVE IMPACT

If a product's or service's impact cannot be quantified then one has to rely upon anecdotes to persuade prospective customers that the product or service is worth buying. But if impact can be quantified then it can be compared against some baseline or current performance level. Clearly, if quantitative impact is huge - for example, reducing development costs by 40 percent or increasing communications by 30 percent - then it is easy to persuade customers about at least piloting a product or service.

Ideally, impact reduces some form of "pain," though at times (during bull markets) the impact of "vitamin pills" can be appealing. Quantitative impact also helps differentiate products and

services (see below for more thoughts about differentiation). CIOs work hard to measure the expected impact of a new technology or technology service. When the data is compelling the business case for investing in the technology is obviously much easier to make.

5. CHANGES TO PROCESSES AND CULTURE

If a product or service requires organizations to dramatically change the way they solve problems or the corporate cultures in which they work, then the product or service will be relatively difficult to deploy. Conversely, if a product or service can flourish within existing processes and cultures, it will be that much easier for organizations to adopt, for organizations to assure that the roles and responsibilities of existing business partners and end users will not be required to change dramatically.

A good example here is customer relationship management (CRM). CRM is not technology, software or “architecture”: CRM is a state of mind, a philosophy, a business strategy. It is amazing just how many companies believe that a CRM (in-house or hosted) application is the answer to their customer relationship problems. Successful CRM software applications that we buy (from Oracle/Siebel) or rent (from Salesforce.com or Microsoft) assume a variety of things to be true before implementation (though the vendors tend to hide many of them in the fine print). Newsflash: if a company is not customer friendly, technology will not change a thing (except the technology budget).

CRM software applications will not change a company’s CRM processes. If a company’s processes are hopelessly broken or customer negligent there’s a process gap that must be filled through management decisions designed to specifically to close the gap. In other words, if the customer-centric processes are non-existent or broken, then investments in CRM software applications will require huge new investments in CRM processes and, indeed, the very culture of the company – which must transform itself from a customer-neutral or customer-hostile culture to a customer-friendly one. CIOs understand full well the implications of “culture change.” Technology investments that depend even a little upon “culture change” for their success are much less likely to succeed than those already aligned with existing processes and culture.

6. TOTAL SOLUTIONS

Increasingly, the market is looking for integrated solutions to broad complex problems. While it is great to sell personal computers, it is better to sell personal computers, asset management systems, break-and-fix support, **and** desktop management strategies. Why? Because companies need all of these services and must often work with multiple vendors. It is just plain easier – and often more cost-effective – to work with fewer vendors, and sometimes one “strategic partner” represents the best integrated solution. The “solutions integrator” which promises end-to-end support for whatever technology problem clients might have can become that strategic partner.

CIOs are increasingly sensitive of the inter-relationships among all facets of their technology environments, including especially the inter-relationships among applications, communications, data and the services that support it all. They are always on the lookout for technologies and services that cross-cut their infrastructures – for “solutions” that solve as many problems as possible.

7. MULTIPLE EXITS

Since not all technology investments work perfectly, it is nice when there are multiple paths to success. CIOs bundle their possible outcomes within larger risk management frameworks. If a major application fails, they think about how to mitigate the impact; for example, smart CIOs will never cut over to a new application until the application has been thoroughly tested. This means that organizations frequently run two applications for the price of three as they make sure that the new application does everything it is supposed to do. CIOs do contingency planning whenever

they commit large resources to a technology investment. The deeper these plans the more likely they are to invest. If there is but one outcome connected to a possible technology investment, it is less likely to be made than where there are several ways to win.

8. HORIZONTAL AND VERTICAL STRENGTH

Microsoft is the quintessential horizontal technology company: it sells software to anyone and everyone, regardless of their vertical industry. But there are companies that only sell to specific industries, like insurance companies, banks and pharmaceutical companies, and there are companies – like IBM and many of the larger consulting and systems integration companies – that sell horizontally **and** vertically, with consulting practices that specialize in multiple industries. The best products and services are those that have compelling horizontal **and** vertical stories, since CIOs want to hear about industry-specific solutions or solutions that worked under similar circumstances (like for a competitor).

CIOs would love to see the major vendors of hardware, software, and communications infrastructure develop full vertical suites complete with all of the bells, whistles and hooks that make it possible to transact business across any number of vertical industries. Issues like privacy, compliance, reporting, business-to-business (B2B) transaction processing, database management, and security, among others, are approached differently by different vertical industries.

9. INDUSTRY AWARENESS

If no one has ever heard of the product or service someone represents, then there is an uphill investment climb. While there are sometimes huge opportunities to create brand new awareness – and in the process become a market trend setter – it is often easier to sell into an area that already has high industry recognition. Perhaps the most obvious validation is from the conventional industry analysts, like Gartner (www.gartner.com), IDC (www.idc.com) or Forrester (www.forrester.com). CIOs have a tough time internally selling products or services with little or no name recognition.

10. PARTNERS AND ALLIES

It is getting harder and harder for companies to go it alone. Given trends in "solutions integration," outsourcing, and the pace of technology change, it is necessary for (especially) new companies to form the right channel partnerships and alliances. While direct sales and marketing can often work extremely well, it helps to have the right friends in the right places saying the right things about products and services. Relationships with the management and technology consulting companies, the systems integrators and the support vendors can extend a technology company's reach by orders of magnitude. Companies unaware of this reach are likely to miss important channel opportunities.

CIOs expect a broad network of support. Put another way, they prefer to invest in technology clusters (see the above discussion of "right" technologies and technology services).

11. "POLITICALLY CORRECT" PRODUCTS AND SERVICES

It is difficult to convince conservative enterprise buyers of technology products and services to adopt something new: no one wants to live on the "bleeding edge." CIOs will not risk their careers on what they perceive as risky adventures – even if the "risky" product or service might solve some tough problems. Buyers also want products and services that will ease real pain. While "vitamin pills" are nice to have, "pain killers" are essential. Reducing costs, measurably improving processes, and improving poor service levels are pain killers that make buyers look smart.

Politics has a profound effect on business technology decision-making. Everyone relates to politics and the impact it has on corporate behavior. Politics is one aspect of the overall context that influences decisions. The others include the culture of the company, the quality and character of the leadership, the financial condition of the company, and the overall financial state of the industry and the national and global economies, as suggested in Figure 3.

The three most obvious pieces of the puzzle include the pursuit of collaborative business models, technology integration, and interoperability and the management best practices around business technology acquisition, deployment and support. Three of the other five – politics, leadership, and culture – are “softer”; two of them are “hard” and round out the context in which all decisions are made. It is important to assess the political quotient of companies. Some companies are almost completely political: a few people make decisions based only on what they think, who they like (and dislike), and based on what is good for them personally (which may or may not be good for the company). Other companies are obsessive-compulsive about data, evidence and analysis. In the middle are most of the companies out there, with some balance between analysis and politics.

What about leadership? Is it smart? Is it old – nearing retirement? Is everyone already rich? Is everyone still struggling to get back to where they were financially in 1999? Is it embattled, struggling to retain control? Is the senior management team mature or adolescent? Is it committed to everyone’s success or just its own? Is it compassionate or unforgiving? The key is the overall leadership ability of the senior management team. There are some really smart, skilled and honorable management teams out there and there are some really awful ones as well. Trying to sell a long-term technology-based solution to a self-centered team with only their personal wealth in mind will not work; trying to sell the same solution to a team that embraces long-term approaches to the creation of broad shareholder value usually works very well.

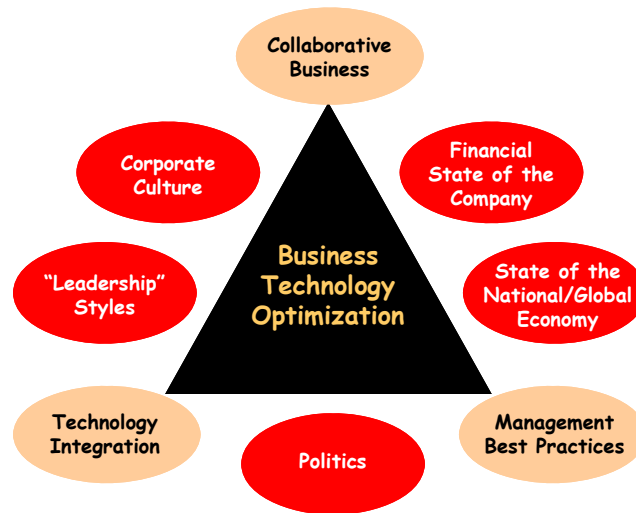


Figure 3. The Whole Context

How well is the company doing? Is it making money? Has the CIO received yet another memorandum about reducing technology costs? Is the industry sector doing well? Is the company the only defense contractor losing money? Is the company the only pharmaceutical company without a drug pipeline? Or is everyone in the same boat? Is the general economy looking good or are there regional, national or global red flags? What is the confidence level for the sector and the economy? Where is the smart money going? It is essential to position companies within the larger economic forces that define national and global bear and bull markets.

CIOs pay very close attention to politics, culture, leadership, the company's financials and the overall national and global economies. If the lights are all red, maybe it is a bad time to propose any changes or large technology investments. But if there are some red – but mostly yellow and green – lights, then perhaps it is time to work the context to an advantage. One thing is for sure: ignoring any of the pieces will jeopardize the chances of success.

12. RECRUITMENT AND RETENTION

Finding truly talented professionals to staff product and service companies is emerging as perhaps the most important challenge facing companies in all stages of development. Companies that have identified employee recruitment and retention as core competencies are more likely to survive and grow than those that still recruit and retain the old fashioned way. Creative solutions to this problem are no longer nice to have, but a necessity or – stated somewhat differently – creative recruitment and retention strategies are no longer vitamin pills. They are pain killers. CIOs expect their technology product and service vendors to have lots of really smart, dedicated professionals. If there is evidence to the contrary they are not likely to make the technology investment.

13. DIFFERENTIATION

If a technology company cannot clearly and articulately define its differentiation in the marketplace, then a large red flag should be raised about the company's ability to penetrate – let alone prosper in – a competitive market. Differentiation is critical to success and while not every differentiation argument is fully formed when a company is first organizing itself, the proverbial "elevator story" better be at least coherent from day one. The best differentiation stories of course directly address the uniqueness, cost-effectiveness and power of the new (or old) product or service.

CIOs need a lot of help here. In order to sell a technology investment, especially a large one like an ERP implementation, they need a business case that unambiguously describes how different – and better – their choice is from all of the alternatives. Sometimes the marketplace itself helps with differentiation – or the lack thereof. Industry consolidation usually means that there is not enough differentiation among the players in an area to sustain competitive advantage among the players. This is why there are only a handful of PC manufacturers left, or just a few major data base management or ERP vendors out there. The nature of differentiation tends to change as markets mature. Later stage differentiation is more about execution than the measurable technological differences among products. Sometimes differentiation is only about execution and service, where CIOs knowingly settle for a relatively inferior technology product from a vendor that consistently offers extraordinary pre- and post-sale support.

14. EXPERIENCED MANAGEMENT

The key here is to see the right mix of technological prowess and management experience available to develop and deliver a successful product or service. Ideally, the management team has "been there and done that," and is mature enough to deal with all varieties of unpredictable events and conditions. There are other ideal prerequisites: experience in the target horizontal and/or vertical industry; the right channel connections; the ability to recruit and retain talented personnel; and the ability to work industry analysts, communicate and sell. To this list we might all add a number of qualities, but the key is to find experienced managers knowing full well that past success is not necessarily a predictor of future success. The goal is the assembly of a team of smart, sane, energetic, and appropriately ambitious professionals.

CIOs expect their technology vendors to have solid management teams. They count on competent management to help them deploy the right technology at the right time at the right price.

15. "PACKAGING" AND COMMUNICATIONS

While it may seem a little strange to acknowledge the primacy of "style" over "substance" and "form" over "content," the reality is that "style," "form" and "sizzle" all sell. Product and service descriptions and promotional materials should read and look good, and those who present these materials should be professional, articulate and sincere. Companies that fail to appreciate the importance of form, content, and sizzle will have harder climbs than those who embrace and exploit this reality. What are the pieces of a good technology marketing strategy?

First, consider what is being "sold." Hardware, software, services, image, and perception. When everything goes well everyone thinks that the technology people are really pretty good, that things work reasonably well – and for a fair price. If hardware and software work well, but the image is poor, technology is perceived to be a failure, just as bad hardware and software – but good perceptions – will buy some time. Like everything else, we are selling hard and soft products and services, tangible and intangible assets, and processes. Technology vendors must have compelling stories to tell their clients with supporting collateral materials. CIOs expect to see and feel the buzz of the vendors' products and services. They need it to sell technology products and services to skeptical CEOs, CFOs and COOs.

III. DUE DILIGENCE BEST PRACTICES

There are things to buy, outcomes to expect, and criteria to be analyzed as part of the technology investment due diligence process. The open question – as always – is about the amount of discipline CIOs are prepared to accept and practice.

Many of the assumptions that we make – and empirically validate – can be wrong. Assumptions about the quality of the technology itself may be unwarranted. Assumptions about the people involved in the process may be generous. There is always the intangible, the unpredictable and the unfathomable. In other words, it is impossible to engineer perfect outcomes. The discipline described here can reduce – not eliminate – risk. CIOs need to reduce risk to increase the returns on their technology investments. The application of the due diligence criteria described here can help, so long as we all know what we need to buy, what we can buy and how to manage our investment expectations.

Technology due diligence is a process that involves qualitative and quantitative assessments around fifteen specific investment criteria. The approach described here is part quantitative, part qualitative, part analytical, and part intuitive. Due diligence is organized around a set of constant criteria that can be applied to technology investment decisions of all kinds.

The focus here is on technology due diligence that results in a technology investment of one kind or another. The investment targets include everything from software applications, personal computers (PCs), laptop computers, cell phones, personal digital assistants (PDAs), communications hardware and software, data, security and technology services. The lenses used to vet investment opportunities and challenges are organized around the specific requirements that CIOs need to satisfy to achieve their objectives and the options they have to consider.

Following is a template that integrates the elements of the due diligence process and presents a due diligence methodology.

The methodology suggests that CIOs should identify their investment targets, what they expect to get from prospective investments, determine if they are well-enough organized to apply the criteria, weight the criteria, and then score the technology or technology service against the weighted criteria. The CIO will set the point threshold, but lots of scores below 5 on a 1 – 10 scale should translate into a "no investment" decision. Middle scores should result in a call for more information and high scores should result in an investment.

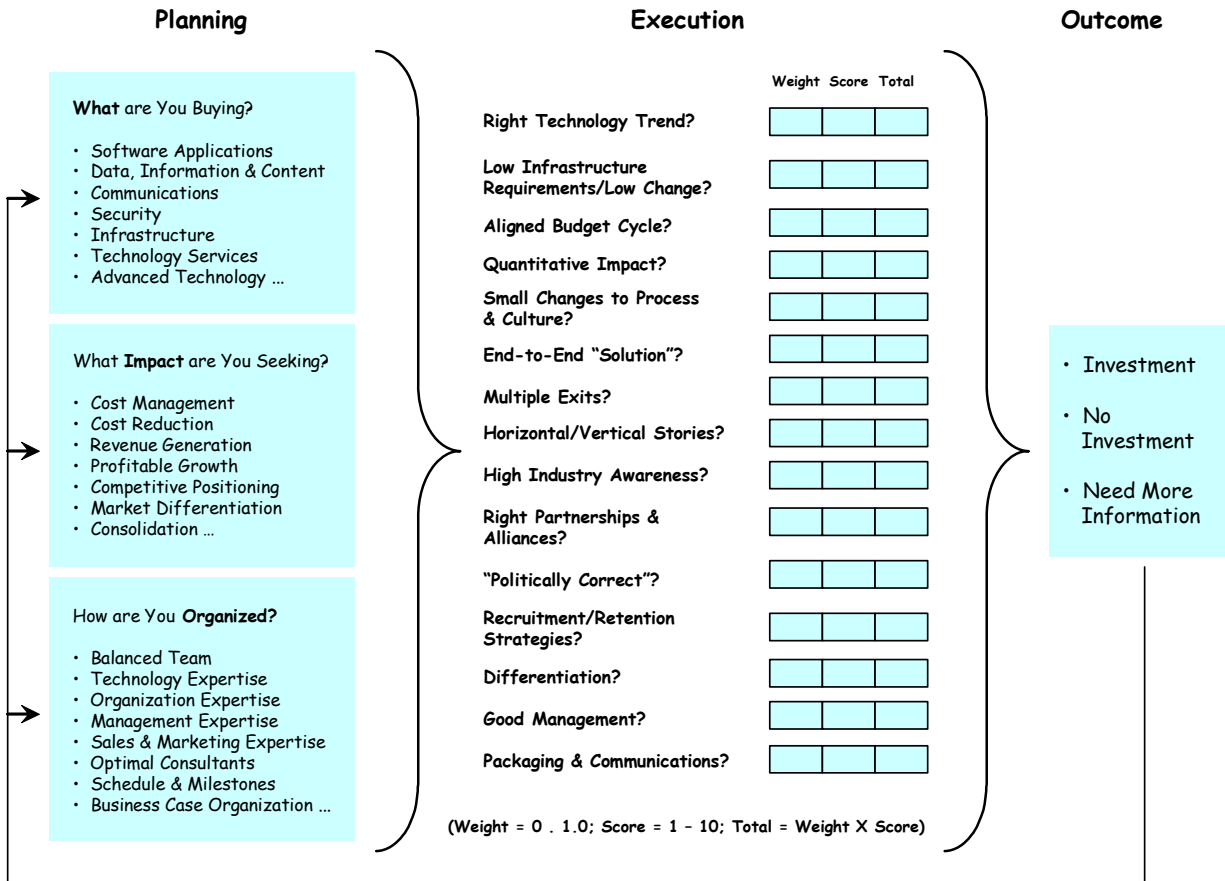


Figure 4. Due Diligence Template

IV. SUMMARY

The role of information technology (IT) is changing dramatically. Before we entered the 21st century, IT was largely about cost management – IT departments were almost always seen as cost – not profit – centers. But the new century has expanded the role that IT plays in most companies. IT is now as strategic as it was operational. Expectations about operational **and** strategic business value of technology are at an all time high – and likely to rise as we move farther into the early 21st century. The Cutter Consortium, a research organization in Arlington, Massachusetts (www.cutter.com) ran an online survey for the past five years which, among other things, measured the role that IT is expected to play in the business and the contributions that IT managers are expected to make to cost management and profit generation. The data revealed that “IT does matter” and that successful technology leaders will be expected to generate **both** cost savings and increased sales [Andriole 2007]. The importance of technology due diligence will rise dramatically as these expectations rise. While in the past it may have been possible to acquire, deploy and support technology in a relatively undisciplined way, investment mistakes will no longer be tolerated. The extent to which CIOs adopt a repeatable, disciplined due diligence process will determine how successful they will – or will not – be. All of this is about reducing the risks associated with bad technology investments and increasing the probability of good ones. Due diligence is the discipline that can reduce risk and increase the return on technology investments. Smart CIOs will practice due diligence faithfully – or fail to meet the expectations of management.

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ABOUT THE AUTHOR

Stephen J. Andriole is the Thomas G. Labrecque Professor of Business Technology in Villanova University's Department of Management. He was formerly the senior vice president and chief technology officer of Safeguard Scientifics, Inc. and the chief technology officer and senior vice president for Technology Strategy at CIGNA Corporation. His career began at the Defense Advanced Research Projects Agency (DARPA) where he was the director of Cybernetics Technology. He has recently published articles in the *Communications of the ACM*, *the Journal of Information Technology Education*, *INFORMS Transactions on Education* and the *Journal on Cases in Information Technology*. He is also the author of *The 2nd Digital Revolution* (IGI Publishing, 2005).

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