

PART I

CHALLENGES OF THE DIGITAL AGE

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CHAPTER 1

THE CRISIS HAS NOT GONE AWAY: OPPORTUNITY BECKONS

1.1 INTRODUCTION

It has been over twenty years since the first edition of the Champy and Hammer book *Reengineering the Corporation* (Hammer and Champy, 1993) took the business world by storm. Yet today, not a single company is satisfied with the speed with which it can respond to fast-changing market conditions. The competitive dynamics have in fact multiplied, with the Internet producing information at a stupendous rate and adding another dimension to the already complex landscape that businesses have to deal with – information. Social media has more recently added to the din, raising both the specter of uncontrolled information flow and the opportunity to reach consumers directly as never before.

The radical re-engineering era had been preceded by two other collective movements to improve competitiveness, referred to as total quality management (TQM) and Six Sigma. It was then, in the late 1980s, that, while I was designing a knowledge-based system for the Global Financial Services group at Apple, I learned of the re-engineering movement in one of my frequent visits to meet with the team at the Cupertino, California, headquarters. I was confronted by a senior executive with six massive binders of TQM flows.

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The company had adopted TQM. I asked my client about when and how they expected to implement the quality processes in the binders. His response, “ten years and we won’t be done even with a small fraction.” Those binders were never implemented, and the entire company division morphed into a different form as the business underwent rapid transformation over the next couple of years.

Business process re-engineering (BPR) was but another dramatic attempt to effect corporate change. BPR was described by its proponents as a “fundamental rethinking and redesign of business processes to achieve dramatic improvements in critical measures of performance such as cost, quality, service and speed” (*The Economist*, 2009). BPR offered the tools to more effective company performance by breaking the business processes apart and identifying more efficient approaches. The analyses of these processes were to be end to end and across functional domains. The argument was that functional groups would over time become protective of their turf and withhold information in the fear that changes could lead, in some circumstances, to the elimination of their steps in the process. To be sure, lack of a big picture view of the enterprise’s business process often does lead to suboptimal decisions at the function level without regard to the efficiency of the overall process. But the BPR strategy proposed an analysis whose result would be a reassembly of the business process in a more radically efficient way.

Among the several corporations that enthusiastically embraced BPR and the Six Sigma processes were Motorola and General Electric. While there is no denying that Six Sigma brought awareness for process quality and granular measurement, the act of studying, modeling, gathering, and then implementing optimal processes did take too long. It was beneficial only in business operations where there is a relative underlying stability, and that in today’s fast-paced world is a significant rarity.

While a few notable successes have been reported, by and large, re-engineering did not find the kind of success the runaway popularity of the 1994 book would have implied. Hallmark reportedly completely re-engineered its new-product process, and Kodak re-engineered its black-and-white film manufacturing process to cut in half the firm’s response time to new orders (Hammer and Stanton, 1999; Smith and Fingar, 2003).

A critical failing of the BPR and TQM movements at that time was the lack of sophisticated technology paradigms. Without technology paradigms being in step with the thinking behind BPR or TQM, there was no real chance of widespread success. While the BPR proponents, including Champy and Hammer, did recognize technology to be an enabler, they did not recognize

technology to be the key enabling factor behind re-engineering. Their view of the new world of work revolved around the reorganization of business processes away from the silo mentality – that of one person executing a business process from end to end instead of creating a team of different people focused on different aspects of the process.

In all likelihood, systemic BPR contrarians scuttled the visionary ideas or reduced them to ordinary games. Of various other impediments, the most pervasive inhibitor was and continues to be the fragmented, inflexible, costly, nonresponsive legacy business technology landscape that underlies all the mission critical business processes that large organizations run on. In fact, it takes the best business leaders and brilliant technologists to successfully work around this encumbrance and deliver business transformation goals, despite being constrained by technology that was only in the recent past considered game changing.

The case studies that follow are based on real experiences. They illustrate how this challenge upturned the launching of new businesses, revenue generation of existing businesses, the customer experience, and operational efficiency.

CASE STUDY 1: CLIENT ONBOARDING IN HEALTHCARE SERVICES

One of the largest third-party administrator of healthcare benefits was struggling to scale to address the variability in their client systems and in efficiently onboarding them

- Client onboarding time at one of the largest third-party administrators for payroll and benefits was greater than 90 days.
- Onboarding of new clients was not possible for approximately three months in a year, while existing clients had to go through their annual renewal.
- The process had been studied repeatedly by every new business leader, re-engineered, partially offshored over the years, new IT systems introduced, but the 90-day barrier remained unbreachable.
- Onboarding every client was a software development project; same was true for any change in existing clients.

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- The resulting 25% annual revenue loss from new customers and unacceptable customer experience for existing ones, was a constant source of significant frustration in the business.
- The business was losing customers routinely.

Most Viable Alternative Continue to target process improvement via Six Sigma projects and identify productivity improvements. Accept the 25% revenue abandonment rate.

CASE STUDY 2: A GLOBAL FINANCIAL SERVICES COMPANY'S NEW PRODUCT LAUNCH FOR ITS SMB CUSTOMERS

The new product launch was a key part of its future growth strategy and time sensitive.

- The company invested significantly in demand generation activity, leading up to the launch.
- This was a transaction heavy loan-origination business requiring an enterprise-grade fully automated platform.
- Six months into the start-up, the business found itself stalled even before the launch. The underlying process-technology framework was taking too long to get production ready.
- Pre-launch market signals pointed to significant adjustments to product specs. The packaged application the organization was counting on was already customized beyond the breaking point and resembled a legacy application before the first day in production.

Path Forward Shut down the project or secure additional start-up funding, inform the market of a 18-month delay, come up with a set of clear requirements (that would remain stable over this 18-month period) and engage a new technology partner.

CASE STUDY 3: LARGEST WORLDWIDE WEALTH MANAGEMENT FIRM LOOKING TO TRANSFORM ITS CUSTOMER EXPERIENCE AND FINANCIAL ADVISOR SERVICES BY REVAMPING END TO END PERFORMANCE REPORTING

The firm needed to upgrade its customer experience in order to retain its valued customers.

- The firm's packaged performance reporting and analytics tools, augmented by internally developed point solutions, were reliable and robust but inflexible and outdated.
- Two outsourced vendors who received portfolio statements from multiple custodians manually entered data from paper statements often over 500 pages long.
- The outsourced workforce grew in tandem as the firm offered broader multi-custodian reporting services to its customers.
- Reports from multiple custodians were generated once a quarter and were available 45 days after quarter end, whereby transactions made during a quarter were reported anywhere between 45 and 135 days late, rendering them useless.
- Regulatory exposure from minimally governed outsourced processes and the loss of mission-critical undocumented tribal knowledge with unplanned attrition was on the rise.

Path Forward Keep operations cost flat by moving resources to a low-cost location, improve cycle time by staffing up, manage process quality and regulatory risks by implementing high touch governance processes. This was a non-scalable arrangement. The cost of operations on a per-transaction basis was rising as growth in errors outpaced any benefits of scale. Or offer multi-custodian reporting to fewer clients which would negate a significant competitive advantage the firm had.

CASE STUDY 4: MARKET CHANGING ACQUISITION BY A GLOBAL CORPORATION

As is the norm, the deal value assumed a seamless and successful integration of the acquired firm and the delivery of all the resultant synergies.

- The acquiring firm had 800 major IT applications and countless point solutions laid out in several sedimentary layers of technology over forty years or more.
- During this time, each successive CIO inherited an ever more complex environment with the mission to standardize, simplify, and establish IT as a strategic asset for the company, but in the end tying the applications ecosystem in ever tighter knots, due to forces beyond their control. Off the shelf solutions had become upgrade proof.
- The acquired company was much smaller in size, with 150 major applications. The migration plan was bookended by converged books of accounts on day-1 and an integrated procure-to-pay process by day-365.

Path Forward The integration plans from the M&A team with limited input from technology, need to be re-planned from the ground up. cursory analysis by the acquiring company's experienced technology team showed that dispositioning the 150 major applications in the acquired company (whether they are retained as-is, retained-but-modified, migrated or shutdown) would take at least five years if there was sustained, strong, and cascading sponsorship (staffing, funding) over that period, even as other priorities emerged and leadership changed. Neither company had ever experienced anything remotely close to that. With technology being targeted with sizable post-acquisition synergy goals in the very first year, even the most enthusiastic team members were skeptical.

The default path forward shown for each of the businesses was possibly the best choice under the circumstances. Beyond these illustrative examples, most business transformation initiatives are gated by, paced by, and inhibited by their legacy technology applications infrastructure, despite having the most current business process management [BPM] and other platforms and tools.

1.2 CHALLENGES WITH CURRENT TECHNOLOGY PARADIGMS: CHRONIC ISSUES OF TIME TO MARKET AND FLEXIBILITY

The four real life examples in the previous section amply illustrate the chronic challenges of time to market and flexibility in business technology. Large enterprises abound with executives who are frustrated with the inability of technology to keep up with their demands. Software applications developed 20 and 30 years ago still power much of our business world, even as most things around them have been replaced, renewed, and reinvented, including the very hardware they run on. Unfortunately, few large corporations have the luxury of undoing the past and starting with a clean technology slate. Plans for new businesses and plans for ambitious transformation need to ride on preexisting legacy application infrastructures that come pre-loaded with the following challenges:

- Outdated legacy applications on obsolete technology running mission-critical business processes, where the coders/developers are no longer available.
- Multiple data and technology standards. An exceptionally large tools and applications inventory and a resultant suboptimal vendor base.
- Off-the-shelf packaged solutions that have been customized beyond their intended purpose and are now the new legacy applications, upgrade-proof and several versions behind.
- In-house point solutions that were developed with great intention that simply added one more point of failure in an already fragile environment.
- IT debris from previous acquisitions that were never fully integrated.
- A business that is demanding more and more responsiveness, and IT is getting disenfranchised.
- IT costs are disproportionately high.

Our business technology landscape still plays out like a black-and-white movie. We are far from having responsive business applications. Nonresponsive applications cannot serve a high-entropy environment. Why is this so? The challenge lies in the inability of the current technology paradigms to meet the demands for rapid deployment of technology to operationalize business actions or strategies.

So what are the big hurdles that have to be addressed to enable a much more responsive business architecture. Business technology has to address

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four challenges to enable an effective enterprise architecture – reliability, flexibility, time to market, and knowledge.

Over the last three or four decades, reliability has been largely solved. Today, if detailed specifications are provided to a qualified technology team, the team will deliver reliable applications. There are plenty of qualified programmers and architects who can deliver a fixed set of specifications. With the emergence of standards like Capability Maturity Model [CMM] and the availability of robust databases, open source software stacks have been crucial enablers in achieving reliability. However, flexibility to meet changing business needs and time to market remain significant challenges.

No business specification is ever complete. No experts, however good they are, can express all of their expertise in a few sittings. Expert knowledge can be partitioned into easily retrievable knowledge and hard to retrieve knowledge that surfaces within the right context. Building in flexibility for what you don't know is a significant challenge in the current technology paradigms.

Most enterprise applications take anywhere between 12 and 24 months from start to initial deployment, and often within limited scope. Such a long time cycle often renders the new functionality obsolete even before the new application is ready. Time to market is a huge challenge, as speed of deployment is inversely proportional to flexibility. If you want significant flexibility, it takes more time than you might think.

Finally, knowledge is a relatively new dimension. It refers to the ability to proactively analyze the enormous amount of structured and unstructured data at our disposal and provide insights for proactive action.

Why does it take 12 to 24 months to build and deploy a robust enterprise class application? The root cause lies in the methods that we use to develop applications. Any application technology stack has three segments – application development (AD) technology, methodology, and infrastructure. Infrastructure has made tremendous progress and has led the other two dimensions. The emergence of the "cloud" and the ability to provision infrastructure on demand has more or less eliminated infrastructure as a bottleneck. But in the present book we will disregard the infrastructure dimension.

While today's application development technologies are a significant improvement over technologies even 5 to 10 years ago, they have made little impact on the overall elapsed time for applications. Many technology frameworks have emerged, such as Java, J2EE, Spring/Hibernate, .Net., Java Script, and a large number of open source tools. These have made programming easier and often faster. But they have not had a huge impact on the elapsed cycle due to the basic nature of the methodology at play. In a conventional software

development lifecycle, programming is in fact a non-value-added translation step in the software development process.

1.3 THE EMERGENCE OF PACKAGED APPLICATIONS

There has also been a major shift in the AD landscape since the 1990s, with mostly commercial packaged software gaining traction, such as ERP applications like SAP, and Oracle. Such widespread use of packaged applications was largely due to the length of time it takes to build in-house applications and the rapid changes in the technology landscape that the in-house organizations were unable to keep pace with. However, there have also been huge gaps between such applications and the way enterprises run their operations. Most of the gaps have had to do with the lack of business process orientation in these applications. Therefore the software does not provide the flexibility to be used out of the box and has required significant and costly customization. Moreover, customizations require extensive programming and often take an inordinate amount of time.

Business process management (BPM) software has emerged only over the last decade to fill the void between packaged applications and the business process needs of an enterprise. Initially, BPM suites provided exception handling and workflow functionality. Even today, they offer very coarse-grained support for enterprise business processes. Since most of these suites have not been designed to support a process from the ground up and end to end, it will be a while before they achieve the fine-grained flexibility to address the dynamic nature of business needs.

While there are a large number of BPM software providers, most have not fundamentally addressed the flexibility and time to market issues. BPM software is not inexpensive, nor is it rapid or flexible, unless it happens to fit a pre-packaged solution offered by the BPM software provider, and rarely is the fit so tight. Invariably, given the coarse-grained support for business processes by all the current BPMS, implementation typically involves a high amount of conventional programming. Of course, the result is a long implementation cycle and inflexibility.

The shift to packaged applications has so far come at a cost. It has taken away the ability of the enterprise to compete. This is especially acute in financial services where the business process is the product. This explains why financial services firms continue to build a relatively high level of applications in-house. Packaged applications for basic accounting and other record keeping functions that are static with no opportunity for creating competitive

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advantage are quite understandable. However, packaged applications become legacy applications the moment they are put into place, unless they offer significant flexibility to be tailored to the needs of the enterprise. Thus, even though, today, applications are becoming more flexible, for the most part they provide limited flexibility to their clients.

The shift to packaged applications may be an admission of defeat by business executives and technologists due to their inability to deliver technology in step with business needs. While it may make sense to buy packaged solutions instead of hiring an expert to build the software from scratch, the ultimate goal should be to be able to tailor or configure such a packaged solution to conform to changes in business needs.

1.4 THE NEW FRONT: INFORMATION; BIG DATA IS NOT NEW; WHAT IS NEW IS UNSTRUCTURED INFORMATION

The immense untapped strategic and operational potential buried in the body of information and knowledge in cyberspace is the latest new dimension that will influence and shape enterprise architecture in the future. It offers tantalizing possibilities of a real time intelligent enterprise architecture. The technology to unlock the potential of big data and make it practical and applicable to drive new value for old (and new) businesses is still in its infancy, and lags the hype around big data by a great distance.

Predictive analytics (statistically analyzing the past to project the future), has been around for decades and will become even more powerful as it is pointed at bigger and bigger, but structured, data. Social media analytics, a more recent phenomenon, has fired the imagination and investments of organizations looking to get a handle on general public opinion toward their product, brand, or company based on chatter on social media platforms, and then using the same media to steer opinion or take other action. And there is a rapidly growing population of data scientists, who are being given the task of taming big data by applying mathematics, backed by organization muscle.

What continues to be out of reach of predictive analytics, rudimentary social media listening, and lightly armed data scientists is the vast and exponentially growing universe of *unstructured data*, both outside and within corporate walls.

As noted in IDC's Digital Universe Study of June 2011, sponsored by EMC Inc., 90% of all data in 2010 was unstructured and, given the technology at that time, mostly inaccessible to machine processing. The big data technology industry is growing at a rapid clip of 40 to 60%, depending on which

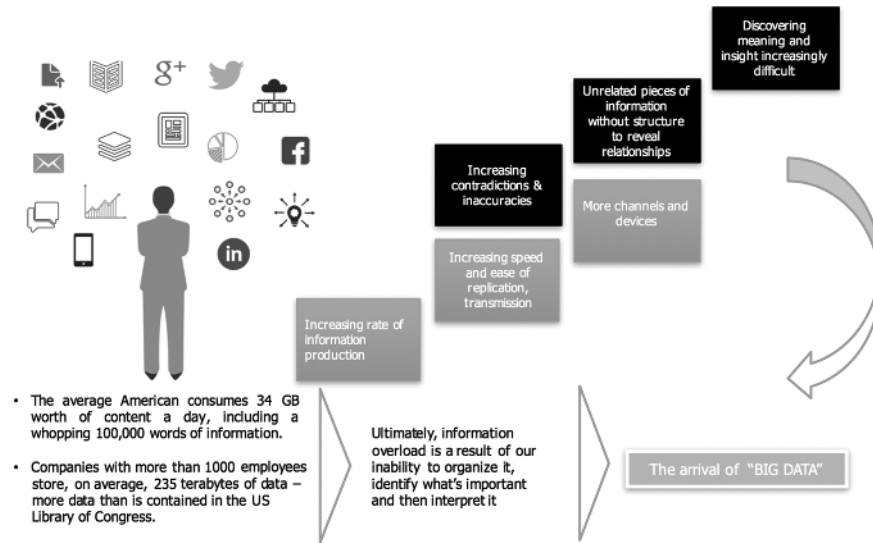


Figure 1.1 Information overload problem

source you trust. However, more than 80% of this spend is directed toward infrastructure, storage, and databases. Only 20% of this investment is directed toward big data business applications (wikibon, 2012). Of the 20%, only a small portion is focused on tackling the biggest big data opportunity – analyzing unstructured data.

The fact that we are producing information at a rate that has long surpassed human processing capacity has even led us to apply words and phrases like “noise,” “chatter,” and “information overload” (see Figure 1.1) to describe this low signal-to-noise ratio phenomenon, as though the problem was somehow inherent in the information and not in our ability to deal with it.

Most enterprises are chomping at the bit to access and leverage the insights from such vast amounts of unstructured data.

While the rush to big data has attracted the best minds and big money, staying on top of and discovering meaning in an ocean of unrelated fragments of information, emerging incessantly, and available 24/7 at ever growing volumes, has turned out to be mostly a losing battle for the pioneers. Leading industry analysts suggest that the big data hype and promise has, for the most part, given way to a less ambitious inward focus in major corporations for the foreseeable future. The mining for insights within internal structured data has left the business of tapping into the potential of the world of unstructured information “out there” for another day.

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1.5 ENTERPRISE ARCHITECTURE: CURRENT STATE AND IMPLICATIONS

Fundamental to the questions of enterprise competitiveness is the question of how enterprises organize themselves and compete? Such an enterprise architecture is central to the issues outlined above and has the potential to undergo a profound transformation as the solutions to the above-mentioned issues emerge (Figure 1.2).

Post Adam Smith, enterprise architecture was based on the principle of division of labor and centered around specialized functions. Each function was supposed to become highly competent and prevent skill fragmentation in producing the end product at scale.

In the modern era with a significantly flat world and with a pervasive technology influence, there have been many proponents of a business process centric architecture. Hammer and Champy forcefully articulated this position in their 1993 seminal work.

There has been a lot of discussion on whether the enterprise should be organized along functions or by process. All these structures nevertheless imply that the architecture is “people led.” People are at the heart of the organization and execution of the work. We can, in this regard, think of an enterprise architecture as consisting of design/strategy and execution. Business

How do we design and operate an enterprise to maximize value?

How can we ensure that the enterprise is responsive?

How can we ensure ongoing competitiveness?

What opportunities and challenges do new technologies afford in enterprise architecture?

How can an enterprise leverage the enormous amount of information that is now available?

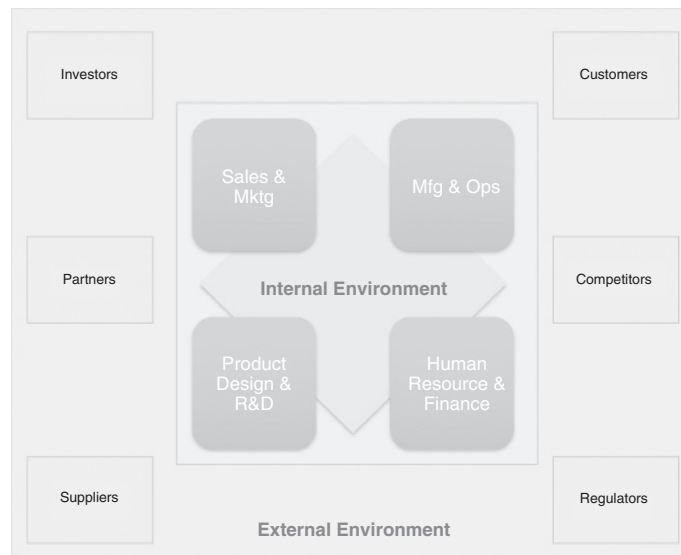


Figure 1.2 Enterprise environment

processes are designed by humans with the necessary expertise and reflect their vision, knowledge, and the overall mission of the organization. Once all components are designed and put in place, then all relevant business transactions constitute a repeatedly executed business process.

1.6 THE INTELLIGENT ENTERPRISE OF TOMORROW

Technological advances, the explosive growth in information, and the emergence of instant, viral communication have combined to create a dynamically changing environment for enterprises. This has had far-reaching implications for how an enterprise architects itself. We believe that, for enterprises to be successful in such an environment, they need to rethink every aspect of their business from the ground up.

Indeed, it may be that the fundamental “people-led” approach to enterprise architecture should change to allow machines to take on a larger role in the enterprise architecture. How much of a role can machines have in the architecture? To be sure, this will vary across industries and firms, but there is no doubt that machines will increasingly assume more of the execution role. And they will increasingly assist humans in the design aspect with assembled intelligence that humans simply cannot collect on their own. Machines will nevertheless need to be instructed by human experts in assembling such intelligence and such instructions will need to be continually monitored and adjusted.

These are the challenges explored in this book. In the next six chapters we attempt to outline what form an optimal architecture for the intelligent enterprise would take.

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