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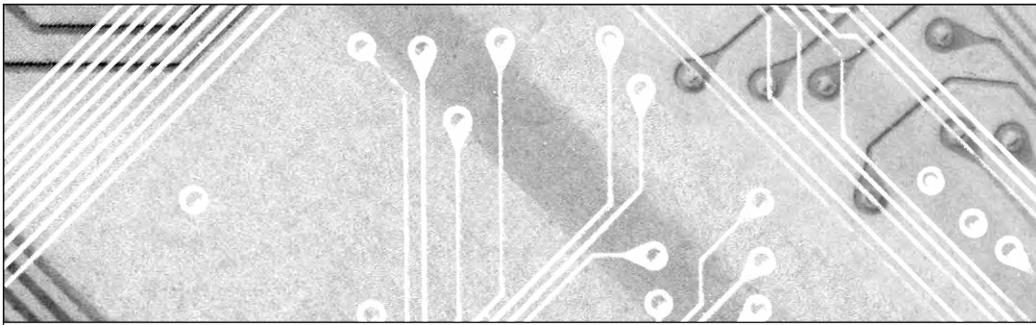
**“Today, social, mobile, analytics, and cloud are the cornerstone technologies driving innovation inside many if not most enterprises.”**

— **Vince Kellen,**  
**Guest Editor**

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# Cutter IT Journal

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by Vince Kellen, Guest Editor

# Opening Statement

From time to time, the corpus of information technologies absorbs new classes of technology, often in one fell swoop. The collection of technologies discussed here — social, mobile, analytics, and cloud (SMAC) — represents such a bundle. A decade ago, social, mobile, and cloud technologies were more a gleam in the eye of innovators than part of the CIO repertoire. Back then, analytics were frozen in a period of glacial change that was moving far too slow to attract much attention except from analysts trying to divine which bigger vendor was going to buy which smaller vendor. Today, social, mobile, analytics, and cloud are the cornerstone technologies driving innovation inside many if not most enterprises.

In many ways, SMAC is rapidly eclipsing the importance of such old standbys as ERP, network infrastructure, and basic communication and messaging services. New forms of data — audio, visual, unstructured text, logging — created by new devices — smartphones, cameras, tablets, superthin laptops — are now creating new business opportunities. SMAC technology has probably forever thrust IT into a front-office, customer-touching role, for which in many cases it is glaringly unprepared. Because of this rapid adoption of SMAC, the CIO role is becoming a critical pivot point for many firms. The CIO is now more frequently required to be a value creator.

In this issue of *Cutter IT Journal*, we bring together five articles with some different looks at the opportunities and challenges SMAC poses.

## SMAC ADOPTION IS SOCIAL

While adoption of social technologies may lag behind the others due to their newness, IT leaders have had the concept drilled into their heads constantly over the past few years. In our first article, Cutter Senior Consultant Dave Higgins and coauthor Sam Clark rightfully point out the distinction between public social networks (e.g., Twitter, LinkedIn, Facebook) and private social networks (those dedicated to a specific company or organization). After all, the way human beings network with each other is complex. Humans may maintain different

sets of relationships for different purposes. For example, many of us have a Facebook presence for connecting with friends and family and a LinkedIn presence for more professional needs.

Higgins and Clark argue that business strategists and IT leaders designing technology for social networking purposes should learn from social science to avoid potential failure of their SMAC initiatives. As they note, “the primary value of social solutions lies in their ability to attract and keep constituents who use [them] because they want to, not because they have to.” While an article making just this recommendation alone would have been helpful, Higgins and Clark go one better. They point out that since the potential uses for any of the SMAC technologies are not fully known, all of them ought to have a robust API so that enterprises can tailor the technologies for their own uses. The adoption of these technologies will require these APIs outright.

In my and my staff’s thinking and elsewhere within Cutter Consortium, this insight resonates. What value others can create will be far greater than the value the designer has in mind. We need systems, human and technical, that support tinkering and tailoring so solutions can emerge from places we hadn’t thought possible and in configurations we hadn’t even considered. Adoption of SMAC technology is itself a very social thing.

## THE CIO IS DEAD?

Just a few years ago, analysts were (nearly gleefully in some cases) writing off the CIO. The argument was that these new technologies, most noticeably the cloud, allow business leaders to bypass the CIO and procure their own infrastructure faster, better, and cheaper. As usual, a funny thing happened on the road to extinction: Big Data and fast analytics. While applications can be procured quicker and easier than before, the authors of our second article — Marc Teerlink, Desmond Martin, and Jan-Paul Fillié — argue that integrating, consolidating, and analyzing data remains a challenge for organizations and a chance for CIOs to contribute to front-office activities. “The better you manage information *about*

business assets, the better you manage the assets themselves,” they aptly write.

Teerlink and his coauthors advise CIOs who wish to transform their organizations into data-driven decision-making fighting machines to be mindful of four stages of transformation. Stage 1 is internally focused on operational efficiency and cost reduction. From analysis focused on internal operational efficiency, organizations can move toward sharing information more widely across the value chain and being more externally focused (Stage 2a) or to more predictive, yet still internal, forms of analysis (Stage 2b). The authors conclude that ultimately organizations should move toward a full “information on demand” model (Stage 3) that is both predictive and shares information across the value chain.

In Stage 3, organizations should be able to analyze structured and unstructured data well, support and utilize collaborative analysis by engaging multiple stakeholders across the value chain, focus on improving revenue and contributing to new product lines or offerings, and generate insights that help the organization determine the next best actions to take. Organizations that do this well tend to outperform their peers, according to Teerlink et al. The massive growth of all kinds of data and the rise of new analytic approaches have given organizations and their CIOs unprecedented opportunities to make significant changes and improvements.

### SMAC: ADDING VALUE OR JUST MORE COMPLEXITY?

Our third author, Nethaji Chapala, asks an excellent question: Is SMAC really helping organizations compete, or is it merely adding more complexity

and confusion? While the already large SMAC pie continues to grow, not all organizations have been able to extract value from their SMAC investments. Chapala argues for a more systematic approach to developing pragmatic SMAC strategies. He identifies two simple matrices that can help organizations clarify their thinking about how SMAC technology ought to be adopted.

First, Chapala suggests that firms analyze SMAC opportunities from four perspectives: products/services, geographies, customer segments, and organizational capabilities. How does the SMAC technology enhance or influence a firm’s products? What role do different geographies — including different cultures, spending patterns, and customer needs — play in adopting SMAC? How do differences within the firm’s customer base factor in a SMAC strategy? What organizational capabilities need to be developed or improved in order to successfully implement SMAC technology?

Chapala provides a second matrix that helps organizations determine how each SMAC technology can be used in combination with one or more of the others. At each combination of social, mobile, analytics, and cloud, a firm can examine how adoption should proceed. For example, how should the firm’s social media assets be deployed across mobile phones? How should analytics play a role in a social media site? How should the application assets be deployed across internal and external data center environments? How much should cloud technology be used? By iterating through these two simple matrices, organizations can at least do better than faith-based SMAC strategies that rely more on luck than on logic.

### GIVE ME APIs

Like Higgins and Clark, our fourth author, Suman Banjeree, voices support for strong APIs within SMAC architectures. I would concur. Some of the recent startups in the SMAC space strike me as oddly retro. Old 1990s-style startup strategies like “lock the customer in,” “attract as many eyeballs as possible and determine business models later,” and “develop the one big hit that can be published cheaply to millions and billions” (versus embracing a long tail of microniches) seem to be back in vogue. Sometimes I feel as if it is 1996 all over again.

Banjeree makes the point that simple APIs built on common standards foster faster developer adoption. Proper documentation, openness for customization, security services, multidevice connectivity, user interface support, and the ability to handle unstructured, lightly

## UPCOMING TOPICS IN CUTTER IT JOURNAL

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structured, and structured data are all features that would improve SMAC adoption. These sorts of APIs also reduce the time it takes firms to tailor technology to fit their unique attributes, helping them get better solutions delivered faster.

Like Banjeree, I would argue that not only is a good Web-based API strategy (e.g., based on RESTful APIs, HTTP, JSON/XML, and even SOAP standards) essential for proper application integration, exposing APIs publicly for potential new and unintended uses downstream can generate new business models and help foster a flourishing ecosystem. It is now an API economy, where organizations can engage in near-friction-free commerce with SMAC solutions with few questions asked.

## GAMING THE SYSTEM

As several of our authors have noted, SMAC technologies can directly impact and interact with the customer. The quality of customer and employee interaction with these technologies is thus critical for success. It is fitting that our last author, Charles Bess, discusses SMAC in the context of gamification. At the University of Kentucky, where I am CIO, our social and mobile technologies include gamification approaches so that we can maximize student interaction and engagement with the university.

Bess begins his article by describing what gamification is and what it is not. He writes, "Despite what its name might imply, gamification is not really *about* games. Its focus is on measurement, behavior identification, and structured change." Gamification aims to change the behavior of employees and/or customers in order to achieve particular business objectives. To help organizations start thinking about gamification, Bess provides a model made up of goals (what the organization wants to accomplish and how this will be measured), rules (how the player can achieve the effort's goals), and feedback (how the game will encourage players to adjust their behavior to reach the goals). He then provides a case study of a successful gamification effort in his own company, HP, and shares some lessons learned.

Bess's article is useful for anyone seeking to embed gamification concepts within one or more of their SMAC initiatives. Bringing gamification concepts to both internal and external systems may provide the necessary incentives and motivation to activate audience involvement. Moreover, with the prevalence of

gamification in much of the Internet, this approach can feel quite natural in many enterprise contexts.

## CONCLUSION

In my own work as a practicing CIO, my teams and I have been so absorbed in SMAC implementation that we haven't had the time to reflect on SMAC's distinctiveness. SMAC differs from prior generations of technology architectures in one important aspect: diversity. SMAC technologies cover a wide variety of use cases inside and outside the firm. The technology layers within each SMAC component are also diverse, with a range of vendors, standards, and solutions. The ways in which firms will create SMAC "gold" out of this vast array of options will likely be equally diverse.

This issue of *Cutter IT Journal* provides interesting perspectives on a few critical aspects of SMAC technologies. As you might sense from the variety of the articles in this issue, we have just begun to scratch the surface of SMAC. There is much more to understand. In this diverse and dynamic environment, it is no wonder why CIOs ought to pay careful attention. The future of their roles and the future of their firms may be at stake.

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# Leveraging Social Science to Boost Adoption of SMAC Technologies

by Dave Higgins and Sam Clark

Having been involved in the IT industry for many years, we find it interesting to observe the constant evolution of technical jargon. Thus we were delighted when we first learned of the acronym “SMAC” — for “social, mobile, analytics, and cloud” — as it embodies the essence of what our company has been doing for over a decade. (And we are eternally grateful that the acronym didn’t end up being “SCAM.”) A relatively new term, SMAC neatly embodies four core concepts that have some natural synergies: “social” equates to engagement, “mobile” equates to personal convenience, “cloud” equates to flexibility and scalability, and “analytics” ties a bow on the package by providing actionable knowledge. So together SMAC represents a bundle of complementary technologies that provide a flexible, scalable, and convenient way for organizations to engage constituent networks and extract actionable insights from that engagement.

So why isn’t every organization embracing all aspects of SMAC? Statistics from a 2012 IBM survey paint an interesting picture of SMAC adoption rates.<sup>1</sup> Not surprisingly, analytics is currently the most highly adopted of the four SMAC technologies (54% adoption in global organizations). What we today call analytics or Big Data is a direct descendant of older data warehousing, OLAP, and BI technologies, even though today’s analytic applications typically involve far larger data sets and much more unstructured data than those earlier instantiations of analytics. Mobile is also rather widely adopted (49% adoption in global organizations), as organizations have quickly embraced the concept of “data anywhere, anytime.” The two lagging technologies in the SMAC set are cloud (at 39% adoption) and social (at 34% adoption). Cloud and social are certainly the newest of the four technologies, and they present some interesting challenges for most organizations.

In this article, we’re going to focus primarily on the social aspects of SMAC: why it is important and what have we learned about social engagement that can extend and enhance the value of cloud-based, mobile applications with analytics.

## HOW SMAC ENABLES VALUE IN HUMAN NETWORKS (SOCIAL SCIENCE)

Mapping different elements of SMAC technologies onto human network behavior allows an enterprise to leverage its networks for an array of different business purposes. As you might expect, a great deal of research has been conducted on online networks in recent years, and this research has accelerated with the rapid rise of online communities such as Facebook, Twitter, LinkedIn, and online dating. In order to get the most value out of a social network, it is imperative to understand who the network members are and to have a deep appreciation of their motivations for participating. Enterprises need to take these factors into account when defining SMAC requirements in order to deploy audience-appropriate solutions.

We have a markedly different perception of “social” than do most organizations. It seems that many view social through either external or internal filters — external being alternate media channels such as Facebook, Twitter, Pinterest, and the like, which serve as technological extensions of traditional media for marketing, advertising, or customer service; internal being collaboration, content sharing, and content management for employees and other internal stakeholders. We believe that social needs a broader definition: that of enabling networks of people to interact with one another to drive value. Human networks — networks of customers, networks of partners, networks of employees, networks of developers, and so on — are the lifeblood of all enterprises. All organizations, both public and private, have them; all organizations leverage them to achieve value. When we use the term “network” in the balance of this article, understand that we mean a human network or network of people. Similarly, we will use the term “network experience” to encompass this broader definition of social.

Consider as examples of our expanded definition two successful enterprises, neither of which is generally considered to be in the business of social: Amazon and

Apple. Both are very good at leveraging their networks to enhance value. Amazon leverages its customers for reviews and product recommendations to enhance sales and customer satisfaction, while Apple leverages its network of third-party application developers to create, market, and sell apps for its hardware platforms.

When analyzing these human networks, it is vitally important to understand *why* people might seek out interaction in online networks and what benefit they achieve by their interaction. Failure to consider the needs of network members is the principal reason why so many online social implementations have failed so spectacularly in recent years. One humorous example, relayed to us by a marketing professional for an organization that shall remain nameless, involved a consumer packaged goods (CPG) company that attempted to create an online community for fans of its brand of toilet paper ... and was shocked when the community never got any traction. As additional examples, we will single out Apple, for its failed Ping social networking attempt, and Amazon, for its (to date) failing Living Social group buying endeavor. The latter proves that even organizations that have had incredible success leveraging some networks can drop the ball with others. To be successful, SMAC solutions must provide benefits not only to the enterprise that will be leveraging the networks, but also to the network members who are asked to participate.

There are several diverse disciplines that speak to the subject of how successful networks form and behave. Disciplines ranging from mathematics to sociology, anthropology, psychology, economics, and communication theory all have tenets that apply at various levels

when crafting and managing human network experiences. Some apply early on when developing strategies for leveraging value out of networks; some apply later when defining the implementation requirements for a network experience; and still others apply to online networks once they become operational.

While it is beyond the scope of this paper to go into depth on the practical application of social science to human networks, we would like to briefly consider as an example the theory of *diffusion of innovation*.<sup>2</sup> First described as such in 1962 by Everett M. Rogers, diffusion of innovation theory has gained wide acceptance. Although it was originally an observation about how the adoption rates of new farming practices spread through rural communities, the theory has since been used as a springboard for numerous academic papers and books across a wide variety of disciplines. It occupies center stage in popular management books such as Clayton Christensen's *The Innovator's Dilemma*<sup>3</sup> and Geoffrey Moore's *Crossing the Chasm*.<sup>4</sup> And even if you don't know it by that name, you are almost certainly familiar with the curve as shown in Figure 1.

The theory that new innovations spread in human networks in a predictable fashion — first to a few innovators, then to early adopters, then to the early majority, then to a late majority, and then finally to laggards — is a concept that has wide application when considering how to best leverage those networks. It applies not only to networks of rural farmers, but also to networks of customers, networks of employees, networks of suppliers — indeed, all human networks.

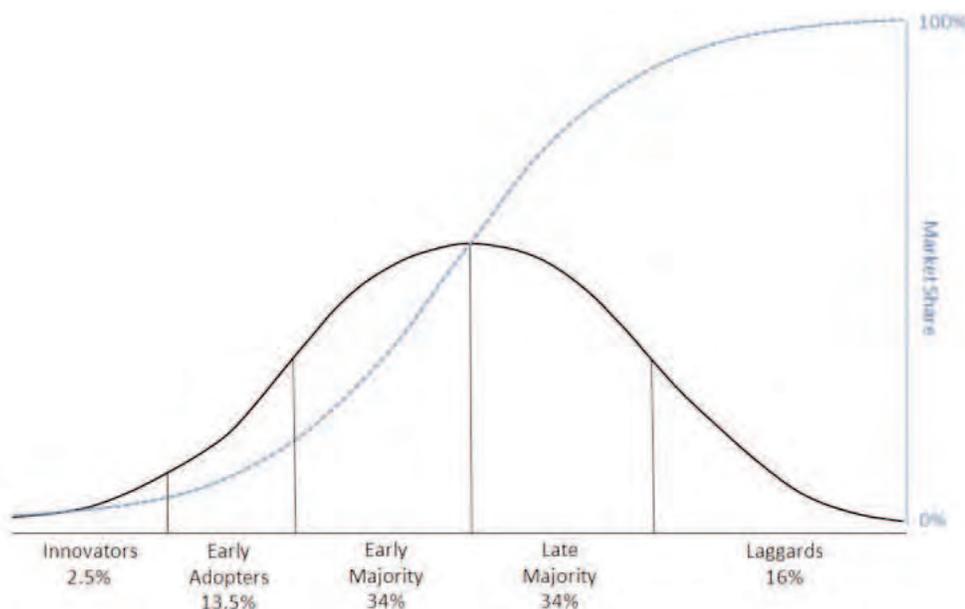


Figure 1 — Diffusion of innovation.

Different aspects of diffusion of innovation theory apply to different levels of network study. For instance, the idea that innovations spread through a network in a predictable fashion and the idea that productivity increases brought about through an innovation will plateau as the adoption rate approaches 100% (the classic “S” curve also shown in Figure 1) are initially quite strategic: they are important considerations when an enterprise is analyzing its high-value networks to see which ones could be utilized to reduce costs or increase revenue by encouraging their members to adopt different types of innovation.

**Enterprises that attempt to apply social networks as point solutions to tactical problems have little success in integrating those solutions into a broader business strategy or overall enterprise architecture.**

Other elements of the theory are less strategic and more tactical; for example, the concept that different factors influence network members to adopt or reject an innovation, such as its relative advantage, compatibility, complexity, trialability, and observability. These are important considerations when implementing a network strategy and defining requirements for a network experience, such as providing automated ways for members of the network to rate or recommend products or ideas.

Finally, the notion that the adoption rate can reach a “critical mass” — where further adoption of the innovation is self-sustaining — is more something to keep in mind when operating a network solution than when conducting either strategic or tactical analysis. This is an important consideration once a network solution becomes operational, and it speaks to the need of the network moderators to give innovative products or ideas an initial push so that adoption can reach the point where it naturally “snowballs.”

When applying social science to the development and operation of network solutions, it is useful to note that concepts that apply at the strategic level generally also have aspects that apply downstream when developing a solution’s implementation requirements and operational policies and procedures. Similarly, implementation concepts (that don’t apply at the strategic level) also apply downstream to operational practices. The reverse, however, is not true. Concepts that apply only to

operational practices don’t apply to strategy or implementation; concepts that apply only to implementation requirements don’t apply to strategy. Interestingly, we find this is why enterprises that attempt to apply social networks as point solutions to tactical problems (such as marketing or customer service) have little success in integrating those solutions into a broader business strategy or overall enterprise architecture (EA).

## **ENTERPRISE ARCHITECTURE FOR HUMAN NETWORKING AND THE POWER OF RESTFUL APIs**

When defining an architecture to support an enterprise’s social goals, we must understand that human networks can come in many varieties and span different types of locations. They can consist of members who connect on their own “in public,” independent of a product or service company’s operational systems (e.g., Facebook, Twitter, LinkedIn, Pinterest, Quora). Other human networks are found on the opposite end of the spectrum, designed by product or service companies (or indeed, even governmental organizations) to drive internal improvements and support a “private” internal audience (e.g., social software–driven employee networks to improve sales or employee retention and performance).

From an EA standpoint, these public systems are inherently more “open,” since the public domain human networks (Facebook et al.), were born and raised in the cloud. With regard to the other SMAC technologies, these public systems naturally leverage social technologies and techniques, are inherently mobile because the everywhere availability of the cloud demands it, and leverage analytics to derive lessons that help incrementally improve the network as a whole.

Meanwhile, the private human networks, from an EA perspective, are not required to be open. And from a SMAC viewpoint, they may or may not be cloud-driven or support mobile and analytic functionality as they strive to make internal collaboration more social.

However, with the third type of human network — a “hybrid network” that bridges the public and private worlds — it quickly becomes evident that a specific type of enterprise architecture is mandatory to help connect and coordinate the public and private networks. A hybrid network has social aspects that are both entirely public-facing and private-facing but tie a whole process together. For example, a public user may want to comment on an issue that all can see and vote and comment on. The enterprise can then transition these comments into a private network space and consider and process

them internally without public visibility. The key top-level requirements for a hybrid network architecture are openness, flexibility, and extensibility. The goal is to have the capability for any SMAC component to be called upon and utilized at any point in a hybrid network where value is exchanged.

These SMAC-supportive architectural requirements are popping up everywhere:

- An architecture needs to be ready to connect prospects to a company's marketing efforts (e.g., a smartphone-outfitted prospective customer spots an advertisement at a bus stop bearing a QR code that awards a coupon when the prospect "likes" a social media Web page).
- An architecture must help generate more loyalty and revenue from established customers (e.g., analytics signal that a particular customer is a strong social influencer in the company's customer community and is therefore awarded special shipping rates).
- An architecture must help fully resolve customer service requests (e.g., it must be able to seamlessly hand off a service activity to a partner through the cloud).

Enabling such scenarios is step one for a SMAC-enabling enterprise architecture.

After achieving this goal comes the revolutionary second step. With the right architecture in place helping to integrate the public and private networks, a company can further enhance the very useful capacity of innovation thanks to the assistance of social technology. The company can move forward even quicker where it could not before to create entirely new services for prospects and customers, develop new products, monetize new processes, or co-create revenue opportunities with partners (e.g., service issues could be handed off from the private network to an appropriate partner for resolution).

The EA technical feature that has emerged to provide the SMAC components such flexibility and data/process openness is composed of REST (or RESTful) APIs. The simplest description of REST APIs is that they expose data and services both internally and externally in a Web-based client-server fashion. Such flexibility helps tackle the numerous possible intersection and integration points inside and outside of a company's architecture in a scalable manner. Therefore, it helps forge valuable synergies by connecting traditional front- and back-office applications with the social, mobile, analytic, and cloud application services.

As companies explore how to leverage REST APIs and the innumerable connection possibilities, they must

recognize that this architectural style requires them to learn to publish, manage, operate, and analyze REST APIs as part of their IT department's core capabilities. Such rigor helps companies securely expose their systems and keep track of the SMAC functionalities they either plan to or already integrate with. Furthermore, it allows them to open themselves up to integration with other companies' processes (i.e., those of prospective or current customers, partners, and suppliers). Extracting value from the SMAC capabilities therefore becomes more orderly, manageable, and measurable.

**With the right architecture in place helping to integrate the public and private networks, a company can further enhance the very useful capacity of innovation thanks to the assistance of social technology.**

#### **"DE-RISKING" TECHNOLOGICAL INVESTMENT THROUGH A SMAC API INFRASTRUCTURE**

Enterprises are only just beginning to embrace the REST API architectural strategy, which helps capture the potential value of human networks over the long term because it is open, flexible, and scalable to a variety of possible network configurations. The value to enterprises lies not only with the initial installation of a solution; over time an enterprise will want to be on a continuous lookout for how to capture additional value as new opportunities arise and networks dictate the need for new experiences. For example, as an enterprise develops a relationship with a customer, it may encounter scenarios where it is best to introduce a partner into the equation to deliver a fitting new product or service. Leveraging a REST API architecture can make it easier to "hook" the partner in to help deliver that added value to the customer relationship. There is also inherent value in the way such architectural flexibility and open architecture "de-risks" the capital decision-making process for software selection, so that the capital risk mirrors the incremental approach decision makers take when going forward with social network strategies.

#### **LEVERAGING "SOCIAL" TO IMPLEMENT SMAC**

Enterprises that attempt to utilize social elements to achieve business goals and objectives often make the mistake of implementing packaged software solutions without regard to the software's suitability for solving

the problem at hand. This is particularly troublesome in the social arena, where the ultimate success (or failure) of the implementation is entirely dependent on whether the targeted constituents (e.g., employees, customers, partners) adopt and use the solution. Unlike packaged back-office solutions, which can be forcibly imposed on a community, the primary value of social solutions lies in their ability to attract and keep constituents who use the software because they want to, not because they have to.

**If network members think that the cost of a relationship with an enterprise is too high relative to the benefits they receive, then they will be disinclined to participate.**

Organizations can apply several elements of social science as a means of developing conditions that promote the use of SMAC technologies in their organizations. One such element is *uses and gratifications* theory. Like diffusion of innovation theory discussed earlier, uses and gratifications theory has been built up over several decades. The theory got its start in various studies of television and radio consumption. Researchers were interested in why people watch (or listen to) different types of programs, from soap operas to political programs, and what they got out of them. From those studies, researchers have extracted numerous reasons why different people watch what they watch. Those reasons speak to fundamental needs that all people share and the personal satisfaction they receive from consuming media content. This has critically important implications when conducting a strategic assessment of potential network experiences.

Another strategic theory with practical application to the study of network solutions is *social exchange* theory, which has roots in sociology, economics, and psychology. The theory states that when viewing a network relationship (say, between a network member and the enterprise, or a network member and another member), people will inherently — and usually unconsciously — evaluate the worth of the relationship by comparing its benefits versus its costs. Relationships in which the

benefits exceed the costs are likely to be long-lived, while those whose costs outweigh the benefits are not.

A theory with similar practical aspects at the strategic level is *equity* theory, first described in the 1960s by behavioral psychologist John Stacey Adams.<sup>5</sup> Like social exchange theory, equity theory speaks directly to the value propositions mentioned in uses and gratifications theory: not only must there be perceived value in a network relationship (the benefits must outweigh the costs), but members must perceive a somewhat equal value to the relationship. If network members think that the cost of a relationship with an enterprise is too high relative to the benefits they receive (perhaps because they perceive that the enterprise gets much more value out of the exchange than they do), then they will be disinclined to participate.

The benefits of network participation can be wide-ranging, from actual goods and services to more intangible concepts such as member recognition, member security, or member reputation. Likewise, costs can either be tangible or intangible, such as effort required to participate, enthusiasm, skill, or tolerance. Understanding how network members might participate in enterprise networks is a critical success factor when analyzing the strategic worth of a network experience.

Consider the “toilet paper community” we mentioned earlier. This was an attempt by an otherwise successful CPG enterprise to create and leverage a network — a community of dedicated toilet paper fans — where none existed before. With a compelling value proposition, an enterprise can indeed create a network from members who have never interacted before, as Apple did with its app developers. But when companies attempt to build communities around brands, consumers are sharp enough to realize that the brand will likely get more value out of the relationship than they will. The exceptions to this are brands that have legions of dedicated fans (e.g., Disney collectors or Harley-Davidson owners). Where there is a preexisting network of enthusiasts, the value proposition is more balanced and more amenable to a network experience. The fans know the brand benefits from their participation, but they still get value from interacting with other fans (which they do in real life even when the company doesn’t participate) and the brand itself.

## CONCLUSION

Today's SMAC technologies provide a robust, extensible, and low-risk platform architecture for the long-term growth of network solutions and the organizations that offer them. We believe that utilizing what we've learned about engineering successful social solutions can (and should) be turned inward on the SMAC technologies themselves to help define and shape their use. The social aspect of SMAC — knowledge about how people find value in interacting with one another — can be successfully leveraged to create vibrant network experiences for members both inside and outside the enterprise, as well as to increase the adoption and success rates of the other elements of SMAC.

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# Challenging CIOs to Drive Front-Office Transformation

by Marc Teerlink, Desmond Martin, and Jan-Paul Fillié

Organizations are increasingly inundated by data: more sources of data, more types of data, and more detailed data. Yet while the volume, depth, and diversity of data continue to increase exponentially, the need to cut through the growing noise becomes more challenging and ever more urgent. Organizations will need a new type of decision maker to address this need.

It's now time for CIOs to step up to the plate — to own and drive transformation to a data-oriented culture — by partnering with their business executives and aligning them to using a customer-centric approach. After all, the only sustainable source of profit is the customer! The opportunity now exists to “connect the dots” across many kinds of data, enabling smarter organizations to gain actionable insights around their customer base. At the same time, the front office is going digital. Thus no one is better positioned than today's CIO to drive this transformation, to architect the new customer experience and enable the organization to turn customer insight into action.

There are pitfalls: the very diversity of data sources presents quality and reliability challenges. Is the data authentic? Is it consistent? Is it plausible? Is it usable? Is it valuable? Is it compliant with regulatory requirements? CIOs need strategies to avoid being overwhelmed, while taking control of the immense potential of “enriched information.” There are numerous business analytics concepts and ideas, yet the challenge for both CIOs and line of business executives is to move from individual expertise to industrialized processes.

## EXPONENTIAL DATA GROWTH: CHALLENGES AND OPPORTUNITIES

“We spend more time and money getting data than using it!”

— CIO of a US global retailer

Every day, consumers and enterprises create 2.5 quintillion bytes of data, with over 90% of all data in the world today having been created in the last two years.<sup>1</sup> This huge volume of data has proven to be both an opportunity and a challenge for organizations that aim

to analyze this structured and unstructured data in order to gain meaningful insights and effectively turn it into dollars.<sup>2</sup> In this article, we focus on the proposition that getting organizations to understand the growing scope and value of analytic insights is only part of the solution. The real challenge lies in actively driving change in prevailing structures and people to effectively leverage the power of those insights.

Can organizations manage this transformation without disrupting their current IT systems or business models? How can new technologies be seamlessly absorbed into existing business-IT processes and culture? Can the business benefit from growing data diversity while retaining operational efficiency? We will address these questions below.

In recent years, CIOs have been turning to a combination of social, mobile, analytics, and cloud (SMAC) strategies in order to better respond to internal business demands to keep their organizations competitive, differentiate their organizations, and provide a better customer experience. As information becomes more granular and more readily available in near real time, decision makers will increasingly come to rely on it (see Figure 1). The overall quality of decision making will improve, shifting from intuitive management to more data-driven decision making.<sup>3</sup> We see a fundamental change in the CIO's role: once an infrastructure manager, now the CIO will increasingly become a steward of the underlying information, with data coming to be an asset and the primary driver of organizational competitiveness.

At the same time, a new role is emerging — that of chief data officer (CDO). This individual is responsible for ensuring that no matter what IT infrastructures are in place, the data that drives the business and resides on those infrastructures is being efficiently managed, properly deployed, and kept fully aligned with the changing speed and nature of the business. The overarching principle is that the better you manage information *about* business assets, the better you manage the assets themselves.

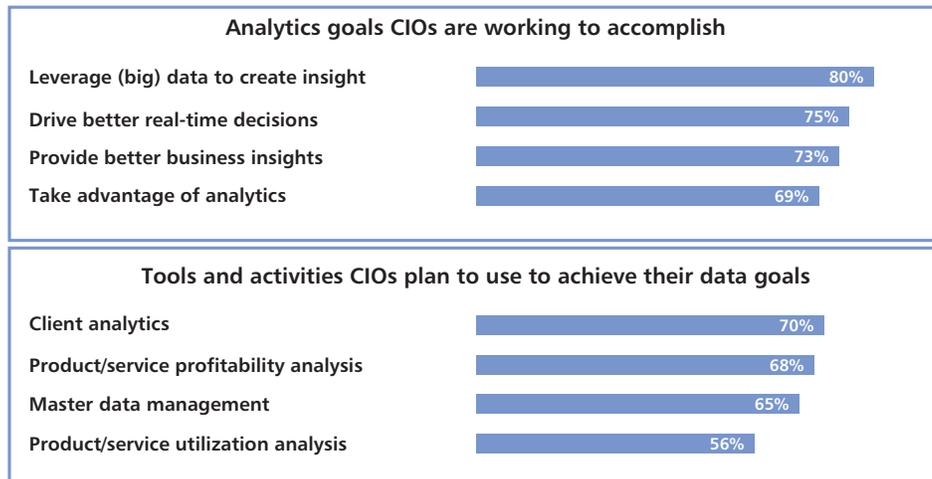


Figure 1 — Top-of-mind issues for the transformation mandate of CIOs. (Source: Korsten et al.)

### Four Steps for Unlocking the Potential Value of Data

- 1. Select, acquire, clean, and capture the right data** into organizational repositories, so as to avoid the “garbage in = garbage out” problem.
- 2. Organize the data** such that it meets the needs of an ever-changing organization and is not locked into a rigid model.
- 3. Consider the analytic tools** that can be used to access and find distinct and usable value in the data, deliver it to the right people in the right way at the right time, and then provide a closed-loop feedback process into the first step, so that there is continual refinement of the process of identifying and acquiring the most useful information.
- 4. Create a data-oriented culture** in which behaviors, practices, and beliefs are consistent with the principle that business decisions at every level are based on analysis of data. Leaders that have mastered this competency set an expectation that decisions must be arrived at analytically and explain how analytics are needed to achieve the enterprise’s long-term vision.

### ANALYSIS WITHOUT PARALYSIS!

The emergence of the CIO in the late 1980s was a recognition that “data processing” was touching more than just core operations. Since IT was increasingly permeating broader areas of the business, it was becoming essential for organizations to take control and ensure that the business and IT capabilities were fully aligned. Today, IT is connected to all of an organization’s stakeholders — particularly its data customers.

Organizations that recognize the need to adapt to changing market dynamics have put in place a “change agent” who is willing and empowered to drive change. Such organizations, which are highly customer-centric, can now deploy these strategies as a competitive differentiator and as an engine for sales growth.

### A FRAMEWORK FOR DATA-ORIENTED TRANSFORMATION

Expertise gained through years of experience with quantified research and case studies has given us insight into some of the more effective customer analytics strategies.<sup>4-6</sup> We will now lay out a conceptual framework that describes four stages of organizational capabilities and how they are enabled by four associated analytics strategies. To create a relevant path for growth through the framework, companies will navigate the stages in different ways (see Figure 2).

Experience has taught us that — typically — leaders and innovators intuitively understand that they should only “bite off what they can chew.” From a starting position in the lower-left quadrant (1), which is characterized by cost-reduction strategies, most organizations will either select transformation through an *information sharing* (collaborative) strategy (2a) or an *information responsiveness* (predictive) strategy (2b) as the next step. We have not observed any company successfully master both capabilities and analytics strategies together, directly moving from Stage 1 to Stage 3 in one step.

The goal state is *information on demand* (Stage 3), which forms the basis of sustainable competitive advantage and can only be attained once *both* Stage 2a and 2b have

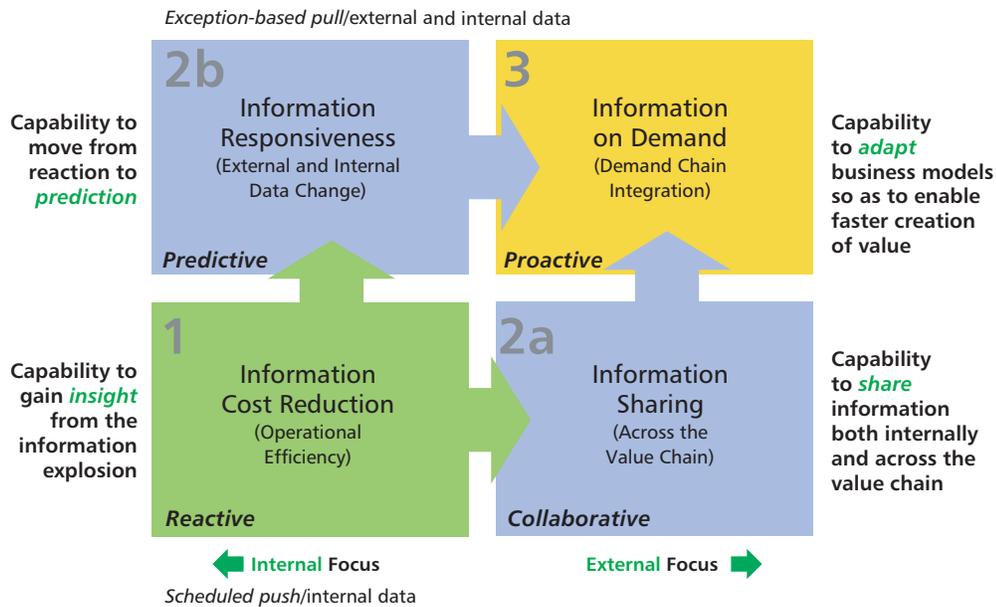


Figure 2 — Analytics strategies that successfully enable the realization of growth-driving organizational capabilities. (Source: Teerlink and Haydock.)

been realized. The framework emphasizes a natural evolution of the data sources, technologies, and skills that are necessary to drive competitive advantage.

### Analytics Strategy Stage 1: Information Cost Reduction

At one time, companies started their journey toward the use of analytics with insights that were fragmented in packages and artifacts, which could not be shared beyond business silos. Then came cost rationalization as a means to establish a more consistent foundation for the existing data. Database consolidation, the removal of redundant reporting, and the implementation of enterprise data models to simplify the access to common data sources led to a major reduction in IT cost.

This focus on creating a leaner information platform has stayed true for many companies, but the next emerging business challenge was data quality. Data quality has proven to be more of a business issue than an IT issue, requiring CIOs to partner with their business peers to create *accountability for* and *ownership of* the data. Establishing a common language and a better understanding of the underlying information has demanded a collaborative partnership.

Poor data quality is a major obstacle in the decision-making process. If information users have little trust in the quality of data, then it will be very difficult to expect them to act on this information. To maintain the integrity of data, organizations are forced to adopt data governance.

Once organizations have achieved a viable infrastructure and trustworthy data, they next seek to find new ways to make discoveries in the world of Big Data.<sup>7</sup> Most organizations start by focusing on tactics to improve the accuracy and granularity of customer segmentation, which has significant impact on the effectiveness of communication with customers. “Less is more,” since less — but more targeted — communication is cheaper (such as when we avoid delivering a catalog to multiple members of the same household).<sup>8</sup> Also, greater relevance means higher conversion rates and a more profitable customer base.

### Key Recommendations for Launching a Data Analytics Program

- **Partner with business executives**, develop questions that insights should answer, and use these to streamline data collection. Don’t worry about getting all data “perfect” at the start, but do begin to get the most critical data for the business “good enough.”
- **Open new communication channels**. Make it a high priority to improve communication and collaboration throughout the organization, especially between the business and IT. Engage internal customers more fully in key IT planning and decision-making processes.
- **Tap the right team**. Carefully match the IT and business talents of your team to the tasks at hand. Implement rotational programs to expose IT

## CASE STUDY: 360° VIEW OF THE CUSTOMER

A leading European manufacturer of medical equipment struggled with the vast amounts of legacy data it maintained at different places across the organization. This was the result of frequent mergers and acquisitions. The organization's biggest challenge lay in the fact that it could not identify its most profitable customers. It was simply not possible to uniquely identify the business partners and their corresponding transactions from one system to the next. Multiple data quality improvement projects had not succeeded in a significant improvement in the trustworthiness and availability of customer data.

The company's board had defined several business transformation initiatives, all of which had data quality issues at their core. The CIO created a "first time right" data governance program with data quality reporting sponsored by some critical business units. This initiative was focused on identifying the most critical data. A data stewardship portal/toolkit was introduced to create a "single version of the truth."

For swiftness, the board directed the CIO to leverage a data quality service from the cloud to identify and resolve data quality issues rather than building one inhouse. The program focused on data ownership and accountability of the people in the business

units who created the data. In order to drive the culture change, the organization altered its reward mechanism and began to reward people for treating data as an asset. The program further ensured that high-quality master data, metadata, and transactional data were made available centrally to the organization.

The improved data in all business units enabled cross-divisional governance, data sharing, and consistent use of clean data. This made it possible for the IT organization to provide the business with a 360° view of customer information through sophisticated dashboards and more advanced types of analytics, including: ROI and revenue, IT cost savings, advanced customer analytics, response time/time to market, end-user satisfaction, and differentiating IT performance factors.

In a first data quality assessment, the organization identified a direct daily cost saving of US \$150,000 thanks to faster accounts payable and the avoidance of data correction. Also, the enterprise was able to reduce a significant number of local FTEs working on manual data cleansing and de-duplications. Another notable — if intangible — benefit was the institutionalization of a common language and business-embedded data governance.

personnel to the full range of enterprise operations, including customer-facing positions.

- **Standardize and consolidate.** Standardize the IT infrastructure and related processes organization-wide. Evaluate and consolidate IT to address gaps and overlaps in the existing architecture. Improve IT governance. Implement basic business process management.
- **Update and renew.** Think ahead and develop practical plans to gradually renew legacy systems and hardware. Introduce and test new technologies conservatively to align with organizational needs and priorities and control legacy costs.
- **Discover the dashboard.** Establish dashboards that leverage data collected to measure key business and IT metrics, including: ROI and revenue, customer satisfaction levels and other customer information, response time/time to market, system availability/downtime, and employee satisfaction.<sup>9</sup>
- **Create a framework for compliance** with data privacy and security mandates.

## Analytics Strategy Stage 2a: Share Information Internally and Across the Value Chain

The volume of data is increasing at a rate far greater than the ability of our tools and our people to exploit it.

— Senior VP of a European global food and beverage company

Today's 21st-century customers expect to interact with any business using whichever digital device or channel they choose, wherever and whenever it is convenient for them. Rapid adoption of smartphones and tablets demonstrates how consumers are gearing up for mobile shopping.<sup>10</sup>

Organizations that limit their information sources to what resides inside their four walls are taking a very limited view of the world. Similarly, organizations that do not openly share information across their value chain will invariably lose market share to their competitors.

To the consumer, it makes sense to browse and gather information via one channel or touchpoint (e.g., in store or via tablet, catalog, or Internet), purchase through a completely different channel (e.g., call center or Internet), and pick up merchandise in yet a third (e.g.,

retail location). Consumers demonstrating this pattern are broadcasting a clear preference for ease of use, speed, and convenience. While this doesn't necessarily mean that all systems are talking to each other, it does mean that information must be flowing appropriately to all concerned parties, since human interaction and collaboration play a central role in business processes.

**For most processes, there will come a tipping point where "speed to insight," coupled with rapid response, enables an entirely new way to operate.**

Organizations in Stage 2a of the customer analytics framework shape a consistent customer experience across multiple channels. To do so, organizations within this stage of the framework must have a clear analytics strategy that optimizes information sharing between all stakeholders.

The challenge for CIOs is to create an environment and means of interaction within the company that enable an organization to capture and share collective wisdom, collaborate, and make decisions with greater confidence. If all transactions can be captured in an "activity journal" (e.g., similar to an audit trail), they can be tapped for insights into how and why the organization collaborated and how and why decisions were made and enacted.

#### Key Recommendations for Data Sharing

- **Use Big Data** to expand/enhance customer and partner relationships.
- **Create analytic centers of competence** to organize shared competencies and enable simplification.
- **Create the business case** to evolve the data foundation by self-funding initiatives. Embark on a journey that will result in a collaborative analytic platform that makes data sharing easy.
- **Extend skills** for Big Data acquisition. Enhance and expand the data that resides outside the organization yet within the value chain and make this data part of the organization's information resources.
- **Change the culture** by rewarding knowledge sharing.
- **Enhance IT's relationship** with the larger organization; grow business-IT intimacy.<sup>11</sup>

- **Update the data security and privacy framework** and embed it in daily processes.

#### **Analytics Strategy Stage 2b: Information Responsiveness — From Reaction to Prediction**

Central to the idea of predictive analytics is being able to replace a rear-mirror view of the business with a forward-looking stance that can start incorporating predictions about where the business is heading. The intelligent "near-real-time" enterprise will present a myriad of opportunities to enhance profit through increased agility. Some of these opportunities will emerge by accelerating the pace at which detailed information is subject to analysis and action, taking processes that currently run on fixed schedules and executing them on a more dynamic basis.

For most processes, however, there will come a tipping point where "speed to insight," coupled with rapid response, enables an entirely new way to operate. These transformational opportunities will have significant financial impact and demonstrate the agility unleashed by the intelligent near-real-time enterprise. For example, the process of enhancing retail on-shelf availability can be optimized by applying intelligence on, for example, an hourly basis. Typical replenishment systems review sales and inventory on a daily or weekly basis (depending on the industry sector) and generate replenishment orders to the distribution center once a reorder point is reached. This process can be driven in a different way by directing a store's stockroom personnel to replenish shelves *before* they are empty. If there is no stock in the store, they will be alerted to substitute the item that has historically proven to generate the highest substitute sales for that specific store.

As different areas of the business are integrated, organizations will reach critical mass in terms of the data that is captured and the analytics that are embedded. Once critical mass is attained, organizations can deploy additional capabilities with moderate incremental effort. Over time, tooling for the intelligent enterprise will lower marginal cost and increase revenues.

Implementing the near-real-time enterprise is not a "big bang" project. We have observed that the most successful CIOs approached this incrementally. Furthermore, there will be a significant human element to this retooling. Business transformation efforts have created huge operational and organizational efficiencies by speeding up and integrating processes. The next wave of transformation will focus on eliminating the human

involvement in routine decision making. The key will be to automate where possible and greatly empower associates where automation is not sufficient — those areas in which insight and creative thinking are essential. The greatest opportunity to add value is not in creating routine reports or presentations, but in innovating with customer-facing products and processes.<sup>12</sup> Both automation and empowerment will create labor economies and major restructuring opportunities.

#### Key Recommendations for Data Responsiveness

- **Innovate on the top line.** Discover new sources of revenue through combining external changes in sentiment with business-driven exception triggers.
- **Develop a culture of predictive analytics,** letting go of rear mirror-view reporting.
- **Hire predictive intelligence capabilities** (e.g., data scientist) that can fundamentally change the business.
- **Encourage widespread application of analytics.** Take an advanced look at what drives profitability.
- **Add dials to your dashboards.** Offer dynamic dashboards using real-time data and use predictive analytics to provide situational metrics, including: formal business case monitoring; sentiment, brand perception, and customer satisfaction or Net Promoter Score (NPS);<sup>13</sup> employee motivation; and social value and sustainability.
- **Update the data security and privacy framework** and embed it in daily processes.

#### Analytics Strategy Stage 3: Information on Demand, Faster Creation of Value

Companies leading in use of predictive analytics and executing effectively across multiple channels have been able to increase top-line growth up to *five* times more than their less sophisticated peer group.

— Marc Teerlink and Michael Haydock<sup>14</sup>

The final stage of an organization's analytic evolution (Stage 3) encompasses the convergence of three capabilities:

- The ability to *leverage structured and unstructured data*, both internal and external, in order to produce highly accurate predictive insights
- The ability to *drive collaborative insights*, in near real time where appropriate
- The ability to *determine next best actions* and execute against them

#### A TINY CHRISTMAS TALE<sup>1</sup>

It's 1 pm on 23 December in the Atlanta offices of Tiny Tim, the replenishment expeditor for FreshFood stores. Tiny is carefully monitoring the sale of 14-pound turkeys today. Sales, which are visible to Tiny by item, by store, and by customer basket within five minutes of each sale, are performing as expected on frozen turkeys, but sales of fresh turkeys are higher than expected in the Atlanta area. An alert appears on Tiny's desktop to tell him not only that turkey sales in North Atlanta are significantly above plan, but that a higher proportion of basket sales with fresh turkeys are linked to purchases of Christmas trees in two stores where a coupon has been offered with turkeys to promote tree sales. Tiny is very aware that while fresh turkeys are a high-margin item before Christmas, they are almost worthless post-Christmas. After all, who wants a turkey the day *after* Christmas?

Tiny works "exception-based, forward-looking." His predictive analytics have alerted him of exceptions (outside his warning thresholds) that determined whether there are nearby stores where fresh turkeys are selling below plan, whether according to social media analytics people intend to shop at these stores for turkey, whether a nearby distribution center has turkeys on hand, and whether upcoming deliveries to the affected stores can be intercepted and adjusted — right now.

Tiny also runs his predictive analytics to determine whether to switch the Christmas tree promo from fresh to frozen turkeys for North Atlanta stores only, and what the expected volume increase would be on both frozen turkeys and Christmas trees. The availability of Christmas trees in the affected stores is taken into account as an additional constraint in determining the optimal promo price, and an additional discount for targeted customers through email and cell phone text messaging is factored in.

The promotion is generated, the new price and offer are transmitted to the selected stores, targeted offers are emailed to selected customers, and price labels and/or electronic price changes are transmitted to the stores within 15 minutes of the decision.

<sup>1</sup>Martin, Desmond. "Survival of the Smartest: A White Paper for the Retail Industry." IBM Global Business Services, November 2010.

The most successful organizations execute a strategy that enables information on demand, which combines all the skills developed in earlier stages with in-depth segmentation approaches in multichannel customer monitoring and where analytics provide real-time recommendations. This is an advanced approach that creates a two-way dialogue in real time between an organization and its customers.

Imagine that your organization were able to increase customer satisfaction with every customer interaction. What if your customer-facing teams had the information and insight necessary to delight your customers every time they made contact? What if you could proactively provide service to your customers before they even knew that they needed it?

For many commercial organizations, this vision is a stretch. At the heart of the issue is the lack of a consistent customer-centric contact strategy that spans both business functions and channels. Organizations now understand that they are failing to maximize the value of their customer relationships. Though they state that they want to change this situation, they equally know they

are not fully embracing new channels of interaction, such as mobile devices and social media, nor creating reward mechanisms to drive a data-oriented culture.

#### Key Points

- **Information growth.** The Big Data explosion is irreversible and undeniable, and is creating ...
- **Information chaos.** Unmanaged information growth is not only costly, but also is a source of significant legal and regulatory liability, which necessitates ...
- **Information control.** Achieving competitive advantage from analytics requires improved access and stewardship of data, which demands ...
- **Information engineering.** Higher-quality data delivered through engineered architectures drives considerable strategic and tactical value and reduces data management costs, which leads to ...
- **Best practices in information governance,** which are creating measurable benefits for early adopter organizations.

#### CASE STUDY: DEEP BUSINESS-IT ALIGNMENT YIELDS SIGNIFICANT TRANSFORMATION

A large global European bank is driving its transformation efforts progressively by ensuring tight linkages between business and IT stakeholders. The bank has defined a clear set of business metrics as part of its strategic objectives. These business metrics have been included in the personal business commitments of senior executives and form a part of their performance measures. IT has outlined a set of initiatives to match the business expectations.

In order to meet the timeline set by the business, the IT function has developed a number of unique approaches to transformation that ensure rapid delivery of new business capabilities. Business and IT teams both oversee the progress of the transformation on a regular basis. The alignment between business and IT runs deep, from a strategic level to all aspects of the operational level, and it is directly measured through service- and operating-level agreements. This ensures a closer match between what is required and what is actually delivered and helps to balance demand and supply. Over the past three years of transformation, the bank has been able to reduce its net operating cost by 10% and cut the cost of IT from 27% of total operating costs to just 15%.

#### MAKING IT HAPPEN: ANALYTICS IN ACTION

Culture does not change because we desire to change it. Culture changes when the organization is transformed; the culture reflects the realities of people working together every day.

— Frances Hesselbein<sup>15</sup>

Change programs will inevitably involve major changes in the organizational culture. They must be initiated jointly by the CEO and CIO and supported by an executive committee.

Successful companies achieve momentum by focusing on the questions that need answering, rather than the data or platform.<sup>16</sup> They drive change through a top-down approach in which managers “lead by example.” These companies appoint leaders who rely on fact-based decisions and can meet the challenges of integrating new practices while eliminating inconsistencies. Many companies appoint a board-mandated champion who can listen to both the front line and customers to resolve conflicts and eliminate any barriers to the success of the transformation effort.

An analytics-driven transformation isn’t a one-step trip; on the contrary, it is an ongoing journey with a series of destinations, each a staging post for the next. Along such a journey, many questions will emerge. Companies must be prepared to make the numerous changes — both in processes and corporate culture — that are required.<sup>17</sup>

## Key Recommendations for Enabling Culture Change

- **Involve leaders at all levels.**
- **Address the underlying drivers of behavior.**
- **Engage employees broadly.**
- **Communicate with transparency.**
- **Make culture tangible.**
- **Remember that behavior follows reward.**  
Don't focus only on the organization's value case — remember the employee's as well.
- **Recognize that changing culture is a journey.**

## SHOW ME THE MONEY!

The ability to take data, to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it — that's going to be a hugely important skill in the next decades.

— Hal Varian, professor at the University of California, Berkeley, and chief economist at Google<sup>18</sup>

The problem ... is that the advance of big data shows no signs of slowing. If companies sit out this trend's early days for lack of talent, they risk falling behind as competitors and channel partners gain nearly unassailable advantages. Think of big data as an epic wave gathering now, starting to crest. If you want to catch it, you need people who can surf.

— Thomas H. Davenport<sup>19</sup>

Recent studies show that top-performing companies are three times more likely to be sophisticated users of data and analytics than their lower-performing peers.<sup>20</sup> Another study found that companies guided by data-driven decision making achieved higher productivity and output than expected given their other investments and IT usage.<sup>21</sup> Further research reveals that companies that lead in the use of predictive analytics and execute effectively across multiple channels have been able to increase top-line growth up to five times more than their less adept peer group.<sup>22</sup>

Those companies that are able to apply real-time predictive analytics while executing a multichannel “next best action” strategy had an average conversion rate of 24.1% to 64.3% (cumulative results from all the work

## CASE STUDY: IBM'S PRINCIPLES FOR TRANSFORMATION

IBM identified six key principles as part of its own transformation journey, which began several years ago:<sup>1</sup>

1. **Start a movement.** Executives ultimately drive change, but in the age of the social network, employees expect to have a say in transformation efforts, too. Social media offers effective tools to give voice to employees and give rise to a movement.
2. **Establish clear transformation governance.** A management system — or governance model — that reflects consistent business performance is established to guide ongoing transformation. This system should also make sure that the people and IT leaders are capable of taking responsibility and driving action.
3. **Deploy analytics software.** Transformation requires a data-driven discussion. As the amount of digital information continues to compound exponentially, analytics software to make sense of this data deluge keeps improving. Savvy organizations — from hospitals to police departments — are deploying smart analytics software to gain faster insight from their information and deliver truly transformative performance.

4. **Radically simplify business processes.** Process design is easily overlooked, but firms that are smart about transformation understand its importance. To drive transformation, an organization must be built on processes that ease the flow of work, not impede it.
5. **Invest in transformative innovation.** New technology alone doesn't create transformation or fix a flawed process. It can, however, accelerate progress and support people as they work in new ways. The key is to tackle process problems first — then apply technology appropriately.
6. **Embody creative leadership.** It's no wonder creativity was pinpointed in IBM's 2010 Global CEO Study<sup>2</sup> as the number one leadership quality needed. It takes a new form of leadership, new skills, and imagination to influence change in a 21st-century global enterprise.<sup>3</sup>

<sup>1</sup>“The Road to a Smarter Enterprise: IBM's Transformation Journey.” IBM Global Technology Services, October 2010 (<http://public.dhe.ibm.com/common/ssi/ecm/en/ciw03076usen/CIW03076USEN.PDF>).

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that lead up to this approach).<sup>23</sup> By comparison, less sophisticated companies that found their competencies still in Stage 1 of the framework had average conversion rates ranging from 1.9% to 4.8%.<sup>24</sup> The payoff of implementing an analytics strategy is clear.

In our experience, one of the most important attributes in the success of top-performing organizations is a collective mindset that differentiates them through a deeper understanding of their customers. These organizations typically have strong C-level executive sponsorship for their chosen customer analytics strategies with a top-down mandate to build the organizational capabilities we have described. They treat information as a business asset, with business managers accountable for customer data and customer communication.

**Social media, Big Data, cloud, and mobile technologies are not mere adjustments to our way of living and working — they are strongly reshaping the way in which we live and work.**

Capabilities created by predictive analytics will lead to either a broadening of the community of users of this technology or a broadening of the diversity of data being used to drive predictive analysis. In the case of a larger user community, a balance needs to be found between collaborative use of data by internal and external stakeholders and clear restrictions on access to sensitive and potentially harmful data. New sources of data (internal or external) can lead to new insight, but at the same time can create an information overload or data quality problems. Social media, Big Data, cloud, and mobile technologies are not mere adjustments to our way of living and working — they are strongly reshaping the way in which we live and work.

Organizations must appraise each new use of data and each new data source, so as to avoid disruption. Both the increase in the use of predictive analytics and the increased depth of information used will lead to a greater agility for the business. This agility can be leveraged to increase the speed of adaptations to new opportunities as well as to maintain profitability and growth. This equilibrium needs to be carefully monitored so the

implementation of an analytics-driven transformation will succeed.

Massive data growth and accelerated change are driving a transformation in people and a change of mindset within organizations — and this in an unprecedented way. In creating the required technology foundation, CIOs must be careful to balance change and stability. Any new technology must enable business change, while this change itself can have a disruptive effect on the organization. Improving analytical capabilities goes beyond the introduction of new tools; it will also change internal processes and the way information is perceived.

Organizations with a data-driven culture have proven to excel at innovation and strategies that differentiate them from their peers.<sup>25</sup> The winners in this world will be organizations that not only recognize these changes, but also transform their way of thinking about and using scarce resources — with information as the key driver of change. Without action, insight is interesting, but not useful.

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# Is SMAC Adding Business Value or More Complexity and Uncertainty?

by Nethaji Chapala

Implementation of social media crowdsourcing helped Starbucks understand customer preferences and generate new ideas that resulted in US \$180 million in revenue in the first year, making a big impact on the top line.<sup>1</sup>

Amazon reported that 30% of sales were due to its analytics-based recommendation engine.<sup>2</sup>

Luxury retailer Mont Blanc used RetailNext's services to improve staffing levels and product arrangement within its stores, increasing same-store sales 20% in the process.<sup>3</sup>

But ... Johnson & Johnson, parent company to Motrin, had to pull a multimillion-dollar ad campaign just days after it launched, losing millions in potential revenue due to furor in social media outlets.<sup>4</sup>

With all the emerging social, mobile, analytics, and cloud (SMAC) technologies, IT is not merely a supporter or enabler of the business but a game changer, bringing differentiation to organizations. While SMAC improves the customer experience — which has become an essential ingredient in the survival of all organizations — it is also yielding innovative services and products through co-creation. SMAC makes available the right information at the right time so individuals can make the right decision the first time, and it empowers stakeholders both within and outside the enterprise through effective collaborations.

While these SMAC trends have made a profound positive business impact for some organizations, not all organizations have been able to harness the value of their SMAC investments. The value of these investments depends on many factors, such as business model, operating model, type of business service/product, customer demographics, organization size, processes, applications, integrations, organization culture, and so on. Organizations that invested in these emerging technologies without doing a proper assessment of the value (business impact) of the investments are not only far from realizing the value of those investments, they are also ending up with increased complexity and wasted resources.

## SMAC PENETRATION IS FORCING ORGANIZATIONS TO EMBARK ON DIGITAL TRANSFORMATION

SMAC penetration in the day-to-day life of consumers and businesses and the rate at which it's growing are forcing organizations to incorporate these technology trends in ways that have meaningful impact on the business, including improving customer experience, product innovation, and brand image while reducing costs. Consider the following key facts about penetration in each of the SMAC component areas:

### Social

- Facebook had 1.06 billion monthly active users as of 31 December 2012, an increase of 25% year-over-year.<sup>5</sup>
- Over 350 million Facebook users suffer from "Facebook addiction syndrome."<sup>6</sup>
- As of June 2012, LinkedIn had 161 million members across 200 countries.<sup>7</sup>
- More than 110 million smartphone users in the US and Europe access social networks and blogs on their phones.<sup>8</sup>

### Mobile

- 42% of mobile phones in the US are smartphones. In Europe, the figure is 44%.<sup>9</sup>
- More than 87% of phone owners access the Internet or email on their handheld device.<sup>10</sup>

### Analytics

- A study from IBM and Oxford University's Said School of Business reveals almost two-thirds (63%) of UK and Ireland businesses recognize the competitive advantage associated with Big Data.<sup>11</sup>
- Online retailers such as Amazon have realized increased revenues implementing Big Data.

## Cloud

- 74% of enterprises are using some form of cloud services.<sup>12</sup>

### KEY REASONS FOR SMAC INVESTMENT FAILURES

Looking at the statistics above, it's no wonder CIOs are under pressure to leverage these emerging technologies to make a positive impact on the business. Yet too many organizations that followed the traditional IT project approach when developing SMAC strategies ended up investing huge amounts of time and money on these technologies with little to show for it. Some of the critical reasons that organizations did not receive the fruits of their investments are as follows:

- **Siloed implementations.** Most of the organizations whose investments failed to pay off invested in a siloed manner, basing their implementations on a particular business unit's (or business units') interests and budgets. For example, they invested in sales and marketing functions to enable social media, mobile, and analytics but left the back office and support systems untouched. This approach not only limits the potential value these investments can add to the organization, it results in customer dissatisfaction due to an uneven experience across multiple channels, products, and services.
- **Insufficient organization capabilities.** SMAC investments don't build the organization's capabilities from the foundation level. These initiatives have to be built on top of existing IT capabilities. Some of these capabilities involve the performance of existing IT systems, the volumes of existing data, real-time capabilities to analyze social and mobile outputs, and so forth. Organizations that do not have such capabilities are unlikely to see a positive impact from these investments.
- **Unwillingness to change business models.** Traditional business models that rely on hierarchical decision making do not work in dynamic environments where digital technologies are disruptive. Such environments force organizations to be more flexible in changing processes and strategies and to engage in faster decision making.
- **Inadequate change management.** While IT capabilities are crucial for SMAC initiatives, change management is equally critical for creating awareness and providing needed know-how. Nor is change management limited to internal users. Organizations have to invest in change management across *all* stakeholders,

including existing and potential customers at all levels.

### KEY INFLUENCING FACTORS FOR SUCCESSFUL SMAC STRATEGIES

There are a number of factors that can affect the value of SMAC initiatives for a given organization. Below are the key influencers that organizations should consider while strategizing about SMAC technologies and investments:

- **Product or service offering.** Not all industries and products will benefit from SMAC investments. In general, consumer-interfacing industries and products have the best chance of getting good results out of these investments. For example, retail is the largest non-technology industry to experience a major positive impact from SMAC.
- **Geographies.** The traditional approach of extending homegrown products and/or services to other countries and geographies will no longer work in the current environment. While emerging markets are growing rapidly compared to developed markets, organizations have to consider country-specific cultures, expectations, ever-changing political scenarios, and the like.
- **Customer demographics.** Though social media and mobile technologies are part of the lives of many consumers, not all age groups are influenced by these technologies. The majority of elders still prefer traditional approaches such as looking for help from customer representatives, in-store buying, and so on.

### A SYSTEMATIC EA APPROACH FOR DEVELOPING PRAGMATIC SMAC STRATEGIES

Enterprise architecture (EA), where business meets technology, is the ideal place to develop a SMAC strategy at the enterprise level. Instead of knee-jerk reactions, SMAC strategies should be developed with a big-picture view of the enterprise, assessing a potential SMAC investment holistically for its value and risks.

SMAC strategies should primarily be driven by effective collaboration, innovation, and external stakeholders and should support flexible business and operating models. We see one such flexible operating model in an increasingly common e-government interaction. A citizen uploads a photo of a pothole in the road, prompting the relevant government agency to engage a subcontractor to fix the pothole. This represents an effective

collaboration between citizen, government agency, and subcontractor. Another such example is Starbucks' crowdsourcing for product innovation, where external stakeholders provide the ideas for new products while social media is used for easy marketing and promotions.

Considering the breadth of stakeholders (including website visitors) who could influence decisions on a SMAC initiative, along with the technology complexity involved in getting the right information with the required speed in a cost-effective way, it becomes clear that devising an appropriate SMAC strategy at the enterprise level is a challenging task. It should be driven by business and EA, in collaboration with IT, taking into account all the aforementioned key influencing factors.

### Drivers Analysis

Understanding the objectives and drivers for a SMAC initiative is very important, as it lays the groundwork for all further analysis in developing the SMAC strategy and architecture. If product innovation is the driver, for example, the organization needs to invest in SMAC in such a way that it generates ideas from various stakeholders, enables product flexibility, and delivers the product in a manner that minimizes time to market. Alternatively, if customer experience is the driver, organizations need to invest in SMAC to enrich customer-facing processes with additional data, empower the staff to take a variety of operational decisions, measure the efficacy of staff, and so forth. Importantly, the analysis should not just stop with the front-end/customer-facing processes and applications. Organizations should take a

holistic view and ensure that all the related back-office processes and applications are also enhanced to satisfy these drivers and objectives.

### Four-Dimensional (4D) Analysis

Investing in SMAC initiatives without performing proper analysis will not only result in not meeting the intended objectives, it will end up creating a negative impact due to increased organizational complexity. To develop an effective SMAC investment business case, organizations should perform a 4D analysis (see Figure 1).

#### Products/Services Dimension

This dimension should analyze whether the organization's products have the potential to see a significant impact from utilizing SMAC technologies and whether it makes sense to invest in these initiatives. As noted above, retail is the largest non-technology industry to benefit from SMAC investments, but not all retail products or sectors (e.g., B2B retailers) do so to the same degree. It is predominantly consumer and electronics products and consumer-interfacing industries that are experiencing great results from SMAC.

#### Geographies Dimension

Organizations should analyze the countries and regions in which they are operating. National/regional culture, customers' spending patterns, SMAC penetration, government policies, regulations, and so on, should all be factors in the analysis. For example, customers in some geographies prefer to go to stores to buy goods,

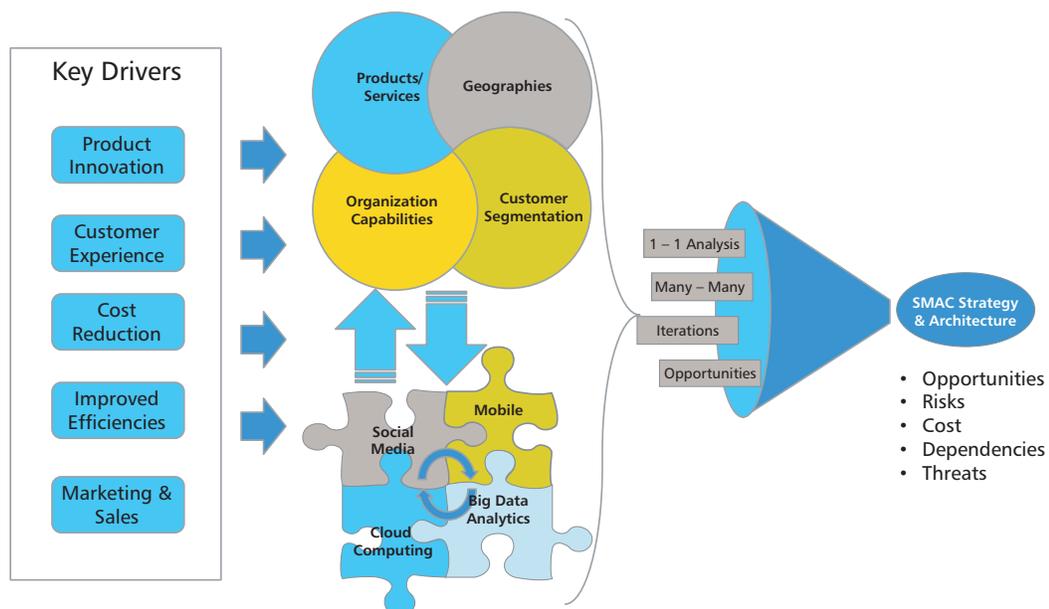


Figure 1 — 4D analysis.

whereas in others customers prefer buying online to save travel time. Uptake of social media also varies across geographies. For example, as of 2012, Facebook penetration in North America was 43.81%, whereas in Asia it was 6.62%, and in Africa it was 4.97%.<sup>13</sup>

### Customer Segmentation Dimension

Customer expectations differ based on age, past experience, and habits, which is something to account for when developing the business case. Organizations should consider all stakeholders, including customers, employees, and visitors, as well as their behaviors. For example, identifying the target customer’s age, gender, and the like, for a given product will help the organization develop effective marketing strategies involving social media and mobile technologies.

### Organization Capabilities Dimension

While all the above dimensions analyze the potential future benefit of investing in SMAC initiatives, this dimension analyzes the organization’s existing capabilities, including operating models, people, processes, and technology. It also factors in the cost. Organizations that do not have the required capabilities will see limited or no positive impact from SMAC investments.

Developing a matrix like the SMAC dimension analysis matrix shown in Figure 2 will aid in performing further analysis at the enterprise level. The matrix helps the organization analyze the impact of each technology in each dimension as well as the relationships and dependencies between them. For example, say a customer visits his bank’s website. Since the bank already knows the customer, it can track his online behavior with social analytics and use the resulting information to offer him a potential product in which he may be

interested. Mixing data from internal systems (with known identities) with data from social analytics and mobile is not easy and poses security risks, which is why doing social analytics tends to be associated with cloud strategy.

Organizations can get more value by bringing these SMAC strategies together and identifying the relationships and interdependencies between various SMAC initiatives, as these are not mutually exclusive. Developing a SMAC interdependencies matrix like the one shown in Figure 3 will aid in performing the analysis with respect to dependencies, risks, opportunities, and cross-leveraging. This will result in the best possible strategies and architecture at an enterprise level for these initiatives.

This systematic approach and methodology ensure the development of an effective SMAC strategy that is practical to implement and delivers to the organization’s expectations and business objectives.

### CONCLUSION

The better the initial thinking and clarity on what is expected from SMAC in terms of business impact and results, the better the probability of success. Taking into account the SMAC influencers and dimensions while formulating your SMAC strategies, and defining an enterprise-level architecture that incorporates these technologies as well as an implementable roadmap, will help ensure positive impact from SMAC investments.

When embarking on SMAC initiatives, organizations have to consider their strengths and weaknesses with respect to their own culture, change management capabilities, and so on. It is a best practice to develop the

	Products (p)	Geo (g)	Customers (c)	Organization Capabilities (o)	
Social Media (s)	Potential Value of Social Media per Product	Potential Value of Social Media in a Given Geo	Percentage of Potential Customers on Social Media	Capabilities Required to Enable Social Media	Impact of Social Media $f_s = f_x (f_p + f_g + f_c + f_o)$
Mobile (m)					Impact of Mobile $f_m = f_x (f_p + f_g + f_c + f_o)$
Analytics (a)					Impact of Analytics $f_a = f_x (f_p + f_g + f_c + f_o)$
Cloud (cc)					Impact of Cloud $f_{cc} = f_x (f_p + f_g + f_c + f_o)$

Figure 2 — SMAC dimension analysis matrix.

	Social Media (s)	Mobile (m)	Analytics (a)	Cloud (cc)
Social Media (s)	NA			
Mobile (m)		NA		
Analytics (a)			NA	
Cloud (cc)				NA

Figure 3 —SMAC interdependencies matrix.

strategy and architecture at the enterprise level and implement them in a phased manner. Organizations should build the strategic foundation while implementing quick-win and tactical initiatives and then leverage these investments.

## ENDNOTES

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# How Can an API Platform Support the Integration of SMAC?

by Suman Banerjee

The world is going through a massive digitalization in the consumer ecosystem due to the influence of social, mobile, analytics, and cloud (SMAC). The evolution of SMAC throws integration challenges in front of enterprises, forcing them to handle various SMAC endpoints in the simplest way. Technology changes around the SMAC ecosystem are happening at a rapid pace, and hence the integration architecture must have an interface layer where the enterprise can adapt to those changes quickly and seamlessly. Traditional integration methods have difficulty aligning with the expectations of SMAC. We really need to think through the options enterprises have to create such an interface layer for adapting to the SMAC trend. Is an API platform the answer? Let's see.

## WHY INTEGRATE WITH SMAC?

We'll begin by making a deep dive into the SMAC ecosystem in order to understand how it changes consumer behavior and why enterprises need to change their strategy to align with SMAC. Nowadays, consumers prefer to be online and stay connected even if they are sitting in a park or on a bus, tram, or subway — in other words, almost everywhere if possible. The reason is the availability of smart devices and network connectivity. Mobile devices and the Internet make information available to consumers anytime and anywhere, which has led to this major shift in consumer behavior. It's time for enterprises to rethink their business strategies, making themselves more adaptable so they can meet consumer mobile computing expectations.

Millions of users are using social media every day. The trend of staying connected has made this a critical channel, and enterprises cannot ignore it. Because users share their thought process through social networks, social media data is extremely important for enterprises, which are using it for marketing analysis. Even bankers depend on social media data to understand consumer responses and financial markets. Today, social discussions can make or break a brand, so

enterprises should look for opportunities to utilize social media data and to expose applications via social media. Both objectives make the integration of social media extremely important.

When we look at information management in organizations, we see that interpretation and reporting of relevant data patterns have become vital. These data patterns not only help organization personnel in their daily work, but also enable their business decisions. To make the data relevant, organizations must be able to analyze raw information and extract the required information. Hence, analytics has become one of the key focuses for enterprises, which take information from different channels such as social media, devices, and other online data sources and use it to study consumer behavior and responses.

Finally, enterprise applications and data are widely available in the cloud. Integration with cloud-based applications and data is critical for enterprises to keep pace with SMAC.

## REQUIREMENTS FOR SMAC INTEGRATION

Let's try to summarize the critical requirements that need to be kept in mind as we integrate with the SMAC ecosystem:

- **Unstructured and semistructured data.** SMAC is driven by digitalization. Most of the digital content is unstructured or semistructured data. So handling unstructured data and semistructured data is one of the key requirements for SMAC integration.
- **Security.** As users are connected to the network with their own devices through the Internet, securing user identity and data is a must.
- **Multiple device connectivity.** Today's anytime/anywhere computing environment is characterized by multiple devices and multiple platforms. Easy integration of smart device applications with your enterprise is another critical requirement of the SMAC ecosystem.

- **Time to market.** Given the pace with which digitalization of the consumer ecosystem is happening, enterprises need to rethink the strategy of building all their own applications and then exposing them to the end user. Now they can get the applications they need through co-development by other interested parties. This reduces the cost of development and also speeds up time to market for getting the required applications to the end user.

**The more flexibility that is granted to developers in the integration, the more they will use the exposed services.**

- **Co-innovation and co-creation.** It is time for enterprises to expose their relevant functionalities publicly to third parties so that they can use them in their own way to provide value-added services to the customer. It is a win-win situation for both enterprises and third-party developers. As third parties use their own resources to build new services, enterprises will incur the least development and deployment cost, while end users will be able to access the services they require. For example, let's say that an enterprise's billing API is exposed and then used by a third-party developer to build a smart device application. This enables customers to look at their latest outstanding bill using their smart device. In this case, we see that the enterprise did not have any development cost, and at the same time, the end users are able to use the service to access their billing information.
- **Integration complexity.** Simple is always better and the most preferred option. The simpler the integration with your exposed enterprise business functionalities, the easier it is for third parties to integrate with them. Simple integration makes your enterprise services more adaptable for third parties.
- **Openness for customization.** The more flexibility that is granted to developers in the integration, the more they will use the exposed services.
- **Least development knowledge.** When we present a method for integration, we need to ensure that even developers with the least amount of development knowledge are able to use the services.
- **Proper documentation.** Proper documentation communicates the understanding and utility of the

services to the consumers in a better way. It also helps in development and integration.

## SIFTING THROUGH THE INTEGRATION OPTIONS

In the old days, we used various integration architecture models, such as point-to-point, hub-and-spoke, message bus, and then Enterprise Service Bus, to mention just a few. Each of these options had its own pros and cons. In the current scenario, the service bus integration model is quite popular. So the question is, can that service bus integration model fit as the solution to handle SMAC requirements? The service bus integration model is good for handling state management and operating within specified standards. At the same time, we see that this model has its own cons, such as complexity and its own standards guidelines; plus it requires significant development knowledge and high development effort. Hence, the need for something different has arisen.

### Use Case: Enterprise ABCD

Let us take a typical real-world use case, which encompasses some of the requirements outlined above. Enterprise ABCD wants to create more brand awareness for its product, with the intention of making the product more popular. It also wants to tap all the opportunities for reaching potential customers through the available channels and mediums. It wants to do a market study of its brand and take corrective actions based on the analysis results.

Enterprise ABCD has a traditional integration architecture, which uses point-to-point system integration. It has also recently started exposing some of its services to its internal consumers via the service bus integration model. The enterprise does not have a big IT team or infrastructure, and hence it takes some time to develop and implement new ideas. Now, with this typical use case in mind, let us see in detail the actual business requirements and whether we already have a solution to handle the aforementioned SMAC requirements.

To meet the enterprise's requirement of expanding its reach to consumers, we understand that exposing the product brand applications to the social media/mobile device world would certainly open up new channels for advertising the product. As for the SMAC requirements, the fact that the enterprise is now interacting with multiple devices via the Internet will make security a key concern. As digitalization is involved, handling unstructured and semistructured data also becomes an

important requirement. Finally, the organization will look to reduce development effort and time in order to remain competitive.

### REST vs. SOAP et al.

Now let's look at the API option. In the early days, an API was used as the interface to the program logic. Software product companies used APIs to expose their product functionalities to external developers. In more recent days, enterprises have been exposing *business* functionalities to developers through APIs. IT tools around the API provide an interface where the enterprise can adapt SMAC technology changes and the relevant applications can integrate with each other via the API interface. This gives the IT world a less complex, less costly integration option, as third-party developers build the functionality. The enterprise, in turn, expands its consumer base and its reach. Currently there are lots of API platform products that enable organizations to integrate enterprise application functionalities with the SMAC ecosystem.

Web APIs have become popular as they are HTTP-based and able to handle unstructured and semistructured data from the Web through JSON/XML. Multiple devices operating on different platforms are also able

to communicate easily over HTTP requests. Developers have readily accepted this solution as it requires the least development knowledge, and, with HTTP solutions, allows them the choice of multiple code languages.

Figure 1 shows us the interaction and integration of SMAC components with the enterprise applications through the API interface layer. Some of the key functionalities of the API interface layer related to mediation, orchestration, analytics, and security are shown in the diagram.

Let's look at social media first. HTTP is always the preferred mode of communication because of easy integration, the ability to handle unstructured data, resources like browser support, accessibility, and updates of social media over smart devices. The smart devices that work on various operating platforms also prefer HTTP and less SOAP dependency because of bandwidth factors and performance issues. Mobile applications prefer REST, in which there is no requirement of state management for an application.

For the analytics ecosystem, which typically deals with data services, the critical need is to handle bulk data in an easy way. While we think of SOAP as the response for handling bulk data, it becomes a less chosen option

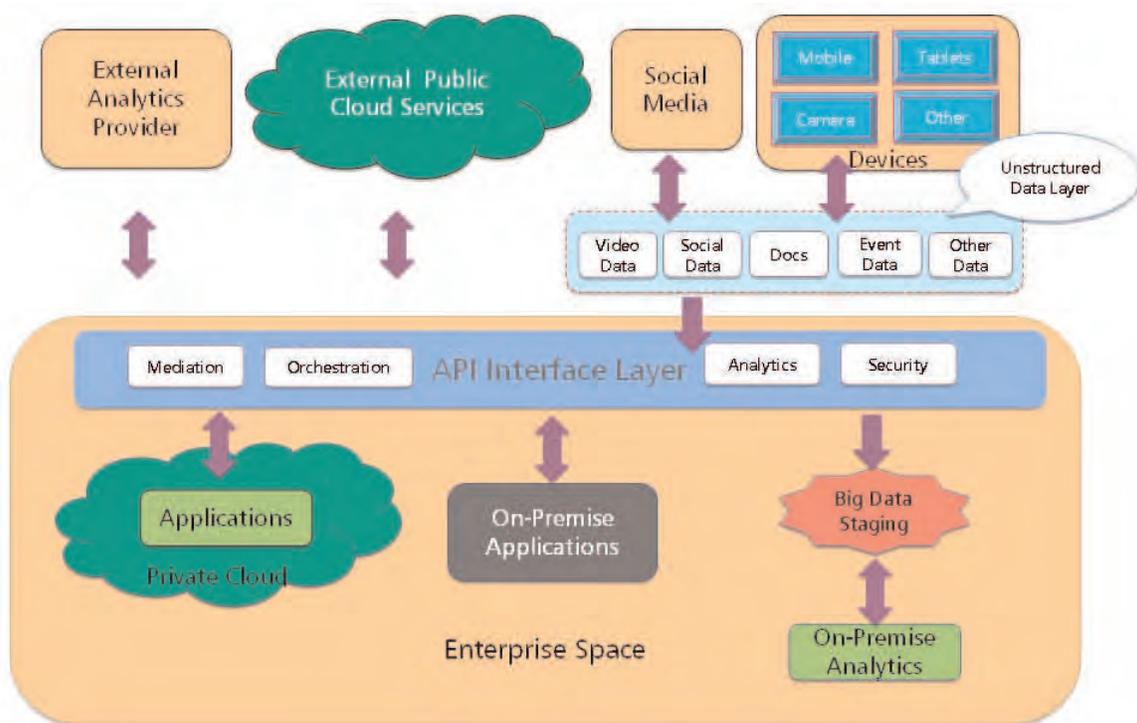


Figure 1 — An API integration reference architecture.

in a SMAC environment — REST being the preferred choice — for performance reasons.

For cloud functionality, the critical need is to make cloud resources such as infrastructure, services, and applications available to the administrators and developers in a user-friendly way. Typically administrators and developers would expect to interact with the cloud resources via a Web page. Here, REST interfaces score higher than SOAP-based interfaces because of the HTTP interface. Cloud providers still offer both options, the REST API and the SOAP API, so it is up to the consumer to make the choice.

The RESTful API has become much more popular than the SOAP API because of its simplicity. The development effort is less, as you can use any language and put it over HTTP and expose it as a REST API. While the advantage of REST is its use of HTTP, SOAP remains competitive by facilitating other transport protocols such as SMTP and JMS. Dependency on XML does put a burden on SOAP implementations, whereas REST is flexible in using XML, JSON, and so on. REST is lighter than the SOAP API and provides better performance when we have network bandwidth constraints. REST is the most popular choice when it comes to the mobile and Web worlds.

When we consider SMAC, REST wins the race, as it meets the typical requirements of the SMAC ecosystem in a much better way than other options. REST scores high in the areas of the bandwidth, simplicity, developer knowledge, and integration complexity. REST loses when you have requirements related to state management and standard specifications, as REST does not support state management and does not have

clear standard specifications at present. Thus the choice between REST and SOAP needs to be made according to the target ecosystem and its related requirements.

From the discussion above, we can see the relevance of the API interface for SMAC initiatives. Enterprises are already aligning themselves with the SMAC trend by using the available API platforms.

## CONCLUSION

In this article, we have seen how the SMAC trend has deeply influenced consumer behavior and why it has become extremely important for enterprises to adapt to these changes. We have also discussed the typical requirements and challenges of SMAC integration and the integration answers in front of us for handling it. In the upcoming days, we can expect to see more integration alternatives emerge for enterprises to explore.

## ACKNOWLEDGMENTS

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# Gamification: Driving Behavior Change in the Connected World

by Charles E. Bess

Everything in life is a game. Someone is always keeping score. Everyone is being measured, whether we like it or not. Gamification, a technique that all business leaders need to become familiar with, takes advantage of this fact. It takes measurement, behavior analysis, and engagement into the business setting in ways that can enable organizations to meet their objectives, providing a real-time understanding of performance to all those involved.<sup>1</sup>

Since this month's *Cutter IT Journal* is focused on social, mobile, analytics, and cloud (SMAC), it seemed like an ideal opportunity to provide more detailed information about how gamification can enable organizations to reach their goals at the convergence of these four other trends. Since it is a broad topic, I'll focus mainly on a framework for understanding and planning for a gamification effort within an organization.

## WHAT GAMIFICATION IS

Gamification is the use of game design techniques, game thinking, game mechanics, and analytics to enhance a business context, thereby changing the behavior of employees and/or customers. Despite what its name might imply, gamification is not really *about* games. Its focus is on measurement, behavior identification, and structured change. Gamification is much more than using the scoring elements of games in a business or educational context. When implemented effectively, gamification is goal-oriented and designed to address specific business objectives. It moves the interface of a business process beyond a simple human-computer interface into a broader, behavior-based feedback loop.

Since the first salesman was hired, businesses have been using some of the techniques that are today considered part of gamification. For example, sales personnel are all familiar with the measurement and reward methods used to improve sales performance. Standard techniques include the use of public leaderboards, sales incentives, and peer pressure to increase performance. The sales bonus plans used in most organization are a

basic example of gamification. More recent strategic techniques, such as the balanced scorecard,<sup>2</sup> include information gathering, analysis, and informed decision making — all activities that gamification embraces.

## WHAT GAMIFICATION IS NOT

Gamification does not mean making everything a game by adding points and badges. Doing something at work that is fun, like playing solitaire at your desk, is definitely not gamification. A gamified solution may be fun and needs to be engaging, but that is a side effect of the effort; fun is not a goal in itself.

Gamification is not about using simulation (in a game-like environment) to model the real world. Simulation can be part of a serious business game, but it is not the same as gamification. A focus on modeling real interactions can be very useful and can be used to understand human behavior in situations, but its focus is usually on providing the “player” with a model of the way the world responds, not changing the player's behavior directly.

The focus of a gamification effort needs to remain on the goals of the organization, the behaviors demonstrated, and the metrics and feedback mechanisms used to adjust behavior to reach a desired result. Not all gamification experts agree<sup>3</sup> with this relatively strict business perspective, but that is the perspective I will use in the rest of this article.

## WHY SHOULD GAMIFICATION BE OF INTEREST TO YOU?

One of the problems many businesses face is that they may have goals and initiatives, but they do not have a solid understanding of the progress they are making or the behavior changes that need to take place to meet the goals. Addressing these insight and behavior gaps are at the core of gamification.

Many retail organizations use “employee of the month” techniques to increase employee engagement and

loyalty programs to encourage shopper faithfulness, so the concepts are not really new. With the social and analytic tools available today and the fact that many individuals keep their computers (smartphones) with them all the time, a more formalized and proactive approach to shifting behavior is possible. We can now apply techniques that influence decisions at the time these decisions are being made, using corporate metrics and knowledge repositories to provide detailed performance information to leaders and individual performers early enough to make process course corrections possible.

The capabilities for interaction have changed as well. With the advent of virtual reality and other advanced interaction techniques, the barrier between the “real” world and a virtual world (i.e., a game context in which performance can be measured, scored, and adjusted) is more permeable. This allows for new behavior modification techniques and business value generation, augmenting real-world activities with performance information.

One of the scarcest resources in business today is the timely attention of employees, both those in leadership and in individual performer roles. Thanks to IT advances, there is an abundance of data and computing resources to automate the normal activities of the business. Gamification is one technique for taking advantage of these analytics and automation practices to help focus the attention of the organization on what needs to be addressed, by whom, and how.

The techniques defined by gamification can be applied to business opportunities such as those shown in Table 1.

Gamification is widely applicable and in no business space more than services. It has been used to expose users to new capabilities or train personnel on the best way to handle various situations. Software development has often been viewed as a target for the application of gamification,<sup>4</sup> especially with regard to project management, where IT’s performance record has always been a concern. There are companies like RedCritic<sup>5</sup> that have gamified the management process of software development and delivery. They have tried to use gamification to focus the developer on specific tasks and provide greater information detail to project managers than previous techniques.

I’ve already mentioned how sales activities across the globe have always been gamified to some extent, but even in this relatively mature area, new techniques are being applied every day to measure performance, communicate goals, and positively influence behavior. The following sections will describe a model for approaching a gamification effort, the elements it includes, and why all of them need to be present for a gamification effort to be successful.

### A MODEL FOR THINKING ABOUT GAMIFICATION

At the highest level, a gamification effort focuses on business goals, rules, and feedback mechanisms used by both the player and the organization (see Figure 1). Below I describe the component layers of the model and the role they play.

Table 1 — Applying Gamification Techniques to Business Opportunities

Gamification Application	Example
Customer retention	McDonalds promotes customer retention with its Monopoly game, which encourages customers to keep coming back to collect more game pieces and thus increase their chances of winning prizes.
Employee engagement and training	Providing clear objectives and real-time feedback to call center personnel about how they are performing in relationship to others can help shift their behavior to maximize value for both callers as well as the organization.
Collaboration across organizational boundaries	Organizations can encourage collaboration by defining goals and providing points for sharing ideas between organizations, as well as increasing diversity to improve innovation.
Business process adoption and improvement	To focus people on the activities that require their creativity, organizations can use real-time analytics and automation capability to automate normal situations and reward staff for shifting to innovative work. The move to cloud computing offers numerous examples where this approach can be applied.
Improved consistency and quality	Organizations can improve consistency and quality by providing metrics on performance versus benchmarks and letting employees know how their efforts compare to their past performance and that of others.

## Goals

In the model, the goals layer is the most complicated, since this is where most of the planning for the organization's and the player's wants and needs is conducted. It is also where the project team decides how the desired (or undesired) change will be measured.

## Players

The first step is to determine what goals need to be met. From there, the project team specifies the players who will be involved. These can be individual performers, the organization's leadership, and/or other affected parties. The players themselves must perceive their participation as voluntary. If they feel they are being manipulated too directly, they may reject a gamification effort.<sup>6</sup> The techniques used need to be engaging and increase the players' (and their leadership's) desire to reach the defined goals. Understanding the motivation, activities, and actions involved is an important component of the initial effort to define the gamification project.

## Measurement

Next the project team needs to determine the metrics that can most effectively describe the progress toward the goals. Like many initiatives today, a gamification effort is iterative. As the project team learns more about the situation or as performance changes over time, it will need to make adjustments to the various model elements. If during the process of the gamification activity the team sees unintended consequences (e.g., cheating) or a misalignment of goals and behaviors, it must make a change. Part of the gamification progression is giving everyone greater insight into the goals, behaviors, and impact of actions. It is natural that there will be changes as understanding develops. Figure 1 shows the elements addressing the goals as a circle because gamification efforts will take a few turns as they develop and mature.

## Behavior

Next the project team needs to identify the behaviors that should be changed. As the team pinpoints these behaviors, it will likely recognize new players and metrics. For example, if the organization is looking to improve employee mastery of new skills, it may need to identify additional resources and embrace them into the effort. Consider the case of IT support personnel. When these individuals first come on board, they are usually allowed to perform a number of relatively simple support tasks. A gamification project can expose them to the fact that there are higher levels of support

capabilities that they could reach. It would inform them of the skills they need to master and how they are performing against those skills on a near-real-time basis.

Once the new support staff have proven they have mastered the basic skills, additional privileges and capabilities can be introduced. From a gaming perspective, they would "level up." The call routing or support management system would then begin to route additional types of work to these employees and expose them to the next level of support capabilities they could achieve. If a new IT capability (e.g., Windows 8) were brought into the environment, new training and achievement tasks would be introduced throughout the various mastery levels. Those who strive to embrace the changes would be recognized, while the quality of service would be improved.

## Rewards

The rewards system is the next stage the project team needs to address. Although it is possible to provide players with concrete rewards like cash, not all people do the same things for the same reasons. Psychology typically divides motivation into two categories: intrinsic (people feel good about themselves for completing a task) and extrinsic (people respond to externally driven rewards like money and recognition).<sup>7</sup> Some people are very status conscious and like to receive public recognition, while others do not. Most gamification efforts have a diverse framework of points, badges, and performance levels included in their reward system so the players can see their progress and compare it to that of others. The reward structure is the most likely place



Figure 1 — A gamification model.

where unintended consequences enter the system. There will be more about that in the rules section, but keep in mind that any system of rewards can be gamed.

## Mechanics

Finally there are the mechanics. Identifying the techniques that will be used and how the process can be made interesting and engaging for those “playing” is critical. Although one doesn’t need to have a Web presence to gamify a business process, Web integration and interaction techniques are typically used. Even a subtle change, such as showing progress toward completion of a task, can have a significant impact on player behavior. When LinkedIn added a résumé completeness progress bar to its interface, the amount of information added by its users increased significantly. This is probably the most cited example of the subtle nature of a progress bar and its impact on behavior.

## Rules

Any game is defined by a set of rules; it doesn’t matter if it is a war game or tic-tac-toe. If you don’t have rules or the rules do not make sense, it stops being a game. As soon as a game feels rigged or unfair, the players will stop playing. Communication of the rules is a critical task in defining and deploying a game.

This means that the rules in a gamification effort need to be simple enough that they can be understood and must not change without a clear reason why. For example, a new hire does not have the privilege of loading programs on a system, while a system administrator does. Once the new employee receives the administrator badge (i.e., job role), new rules will be applied.



Figure 2 — Rules in the gamification model.

Rules place limits on how players can accomplish the goals within an effort. They can free up the creativity of a player so he or she can focus on areas where it will be appreciated. For many situations, these rules are well known but may not have been codified.

Of the numerous types of rules that may apply, the following three are the most relevant at this point (see Figure 2):

- 1. Physical rules** are rigid contextual constraints, such as the number of objects that can fit within a certain volume or the fact that gravity always pulls toward the center of mass. When defining a rule system, you need to ensure that physical rules are not arbitrarily constraining how you structure the game based on your own context. For example, it may be possible to put one gallon of orange juice in a one-pint container if you take some of the water out of the juice. It’s true that it really isn’t orange juice anymore, but that may not be as important a consideration if you are trying to ship it across the country. We see these kinds of issues with data compression in the IT space.
- 2. Business rules** are rules that are specific to a particular country or industry. In the US, for example, HIPAA is a set of business rules with which any organization working with healthcare information needs to comply. Process rules fit into this category as well, although some flexibility may be required — does Step 3 *really* have to take place before Step 1, or is it just that we have always done it that way?
- 3. Social rules** define what is acceptable within a cultural setting. These are affected by the corporate values and principles. Global organizations need to be aware of any regional mores that may come into play.

Since one of the functions of the rules is to minimize or prevent gaming the system, the gamification project team must take care to understand the interaction of player behavior and the rule system when creating and operating the game. Much as in the real world, we have lawmakers and police for a reason. The metrics should provide enough information to prevent bad behavior from ruining the gamification effort for everyone.

## Feedback

In Michael Hugos’s book *Enterprise Games*,<sup>8</sup> he stated that “feedback systems are the new highest calling of information technology.” Timely feedback can be used to change shopping behavior, process conformance, and decision making by organization leadership. I include leadership behavior here as well, since the additional information and control provided by the gamification effort should allow new decisions and options.

The feedback framework defined in the model so far has two major components (see Figure 3). The first is the audience, which is divided into the players, the leadership, and, finally, the public.

Since the wrong kind of feedback can cause players to feel manipulated by a gamification effort rather than encouraged, it is essential that the feedback be clear on what behavior is being measured and how players can control their performance to improve their scores. That feeling of control is critical to a successful implementation.

The organization's leaders need feedback on the performance as well, since their ongoing support is vital to the continuation of the gamification effort. During the goal definition stage, the project team should define the metrics and their expected changes. Updated performance information is provided to leadership on a regular basis, with an analysis of the metrics against expectations throughout the project. This will greatly increase leadership's confidence in the effort.

Many gamification efforts have a social element to them as well. This public sharing of information on performance, progress, issues encountered, and lessons learned can be used to develop a feeling of community. The camaraderie of people working together can be a powerful tool for achieving common goals.

Timeliness is the second major component of feedback. The majority of feedback to the players should be as real time as possible, giving them the information they need to understand and adjust their behavior while in the act of making decisions and performing tasks. Many times dashboards that gather information from multiple systems will require a batch component to gather and update displayed information. Even these information integration efforts should occur in as near to real time as the environment will support.

### A SIMPLE REAL-WORLD EXAMPLE

Even a modest application of this framework can have a measurable effect. Consider an example from my own company, HP.

Each year, HP has a global technical conference for its leading technologists. The only way to attend the conference is to submit a paper and have it reviewed and accepted into the conference by a committee of peers. This year we had about 1,900 papers submitted and accepted less than 10% of them.

To perform these reviews, we identified a hierarchy of reviewers with respect to organizational structures and reviewer skills. We assigned abstracts to these groups

based on the alignment of skills and interests with the content of each abstract. This team approach helped to spread the work around and ensured a diverse set of reviewers would look at each abstract. The review process itself took place over a five-week period.

In recent years, there had been negative trends in reviewer behavior, with a decrease in reviews being performed as assigned and a reduction in the amount of feedback provided to authors. Since the only feedback authors received about their paper (and how to make it better in the future) came from the reviewers, addressing these trends was important to the value of the process. A gamification effort was defined to change behavior.

### Goals

The two relatively simple goals defined were to:

1. Increase the average feedback per paper
2. Increase the percentage of reviews that took place, as assigned, in the time available

The "players" in this implementation were the reviewers. The leadership was the program committee of the conference.

### Rules

The rules for the game were relatively simple. Points were awarded only after a review was entered into the review-tracking system.

We established word count as a simple definition of review feedback quality. Obviously this metric is not ideal and might be easily gamed, but it was quantitative, and we could readily compare it to the previous year's performance. Since this was the first year for the

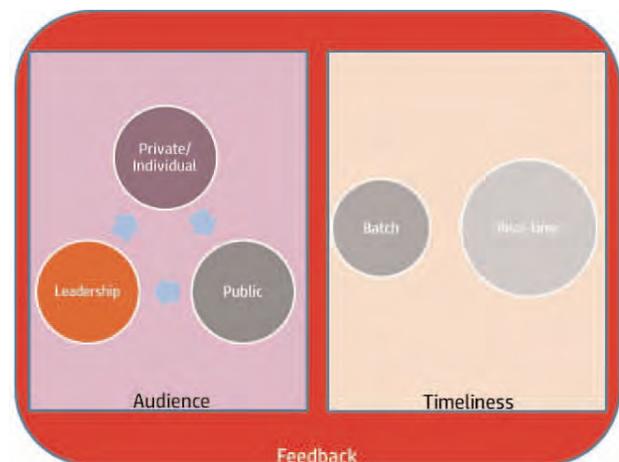


Figure 3 — The gamification model's feedback framework.

effort, it did not appear that anyone changed his or her performance to manipulate the game, but if we do this again in the future, we will need to define a more sophisticated rule structure.

## Feedback

All public feedback of reviewers would be focused on the positive performance of top performers. Any feedback that could be construed as negative would be confined to personalized feedback. We introduced three techniques for providing feedback:

- 1. A reward structure of points and badges** was established to recognize reviewers and their behaviors. Some of these badges were comically named to add a bit of fun to the exercise; for example, the “motor mouth” badge went to the individual who provided the greatest quantity of feedback to authors. Other badges were more performance-oriented, focusing on task performance within a specific timeframe (e.g., most feedback or reviews in a week). There were also team-oriented badges, such as one that recognized the first team to complete all of its reviews. Performing reviews and completing badges all added points to a reviewer’s performance.
- 2. A leaderboard** showing the top reviewers and review teams was updated two to three times a week.
- 3. An email** was sent before and after each weekend (since that is when most of the reviewing took place) that was tailored to the individual reviewer’s efforts. These emails provided relative performance information, any badges the reviewer may have received, and the Web location of the performance dashboard. It would have been better to provide real-time feedback as reviews were checked in, but that was not possible this year.

All the information analyzed and presented was collected using the same review tools as for the previous conference efforts. The only real change in interaction with the reviewers was the inclusion of a personalized analysis of performance and a leaderboard.

## The Results

The results of the effort demonstrated a significant positive performance shift, as shown in Table 2.

## Some Lessons Learned

The most important lesson we learned during the effort was to make the rules more public and well defined, ideally including examples. For instance, there was

confusion about the point system for the badges and their effect. At the end of the effort, when the final performance badges were awarded, some people were upset that their standing went down, long after they had completed their reviews. Although it was clear that there were badges for team performance that couldn’t be awarded until the end of the review period, there were still a number of questions about the point shifts at the close of reviews. (As in previous years, we validated review feedback quality, checking to ensure that reviewers did not bloviate just to increase their average review word count.) Having a well-thought-out communication plan that is reviewed by multiple parties can make communication more effective.

Another lesson came from a survey sent to all the reviewers to gather their impressions on the effort. It was interesting to note that almost 50% of those involved thought the effort had no impact on the quality of the reviews provided, and 27% thought it had no impact on the timeliness of the review process. Only 45% thought the gamification process should be done again in the future. This feedback from the reviewers shows that a gamification effort may be effective in meeting business goals and still be viewed as not having had much impact or possibly even as an annoyance by those involved. Care was taken in this effort to place no additional work on the reviewers related to gamification other than to read and delete the email status message that was tailored to their performance. Once the reviewers saw the actual results, many changed their perspective on the effect of the effort, but not all.

Finally, fun can be part of the gamification effort. Game elements like badges and leaderboards are an important aspect of the effort, but they should not be the only one. The game designer should create a gamification experience in which fun interaction/collaboration takes place — where those involved will actually be interested in greater interaction and understanding what is happening.

When performing initial work on an effort like this, you will get things wrong. Be sure to understand what happened and survey those involved so that you can make improvements.

## GAME ON!

Using metrics and rewards to focus attention on specific behavioral changes can be powerful. Organizations should start small and build their skill, since gamification can be dangerous as well. They should begin with

Table 2 — The Results of HP’s Gamification Effort

Technical Conference Review Metrics	2013	2012	2011	2010
Number of abstracts to review	1,880	1,763	1,592	1,308
Number of reviewers	332	286	277	264
Percentage of reviews completed as assigned	99.12%	95.99%	98.73%	98.69%
Reviews per reviewer	28.31	30.50	28.74	24.78
<i>Feedback word count to authors</i>				
Average	127.45	106.90	104.37	89.71
Standard deviation	82.33	84.37	85.85	94.86
Median	110	91	94	74
<i>Private feedback on issues for other reviewers</i>				
Average	5.76	4.73	4.39	4.64
Standard deviation	17.18	16.97	15.49	16.07

a behavior change that the leadership views as important, since it is unlikely others will care about the results if the problem is deemed trivial.

Sam Walton once said, “Celebrate your success and find humor in your failures. Don’t take yourself too seriously. Loosen up and everyone around you will loosen up. Have fun and always show enthusiasm.” These are the same principles that are at the heart of gamification.

## ENDNOTES

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## ADDITIONAL RESOURCES

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## Business & Enterprise Architecture

Best for organizations interested in using architectural approaches to manage the complexity and cost of IT and to pave the way for strategic planning and portfolio management.

## Data Insight & Social BI

Best for organizations challenged with data collection, analysis, and integration



as well as internal- or external-facing information sharing via social, mobile, or legacy apps.

## CIO Add-On

Ongoing, one-to-one relationships with seasoned expert mentors; research and analysis specially curated to support high-level decision making; peer-to-peer networking.

## Membership Benefits

- Continuous flow of advice, insight, and answers via enterprise access to written and multimedia research from Cutter's top experts
- Priority Access to the Experts: get near-real-time answers to your questions
- Regular strategy sessions with Cutter Practice Directors or Senior Consultants
- Admission to client-only online Q&A sessions
- Participation in peer-to-peer discussions led by Cutter's experts
- Cutter events
- Add-on options for consulting and training offerings

And more ...

To arrange for a free trial membership or to discuss how Cutter's consultants can help your organization, contact our team today: [sales@cutter.com](mailto:sales@cutter.com) or +1 781 648 8700

## What's Unique About Cutter?

- Cutter's internationally recognized expert practitioners provide all of Cutter's research and analysis. You get to tap into this brain trust whose written words have been likened to a "consultancy in print."
- Without exception, every single inquiry is fielded by a Cutter Senior Consultant, Fellow, or Practice Director.
- Cutter approaches every consulting or training assignment as unique, requiring a tailor-made solution, and creates a team for you that includes only its best-in-class experts. We focus on knowledge transfer, so you can leverage our work together and move forward on your own.
- With Cutter, you get cutting-edge thinking from multiple viewpoints so you can determine what's best for your situation.
- Emphasis is on strategies and processes, so you can be sure your success is not dependent on vendor/product detail.
- Cutter is unique in having no ties to vendors. Rest assured that the advice you get is unbiased and in the best interest of your organization alone.
- Focus includes the business management of IT — you're plugged into the research from top business thought leaders.

"I have personally been able to leverage Cutter's services since 1999. Among the attributes that differentiate Cutter from other firms, two remain at the top of my list — *Thought Leadership* and *Real Value* — executed in a practical way.

*Thought Leadership* is driven by Cutter's experts. The advantage is that Cutter doesn't pitch a single best practice for a given area. Instead, Cutter provides multiple good practices/options that come from both academic rigor as well as on-the-ground experience. This provides several benefits for Dairy Farmers of America:

- Exposure and awareness of proven good-practices — particularly for IT, but also for overall business leadership and management
- A finger on the pulse of emerging good practices and IT-impacting trends
- Options for improving our performance
- The opportunity to develop relationships with the experts

The last, 'Access to the Experts,' drives the *Real Value*, letting us go beyond just understanding the options. We can develop relationships with the experts and tailor the options so that they can be quickly and practically executed within our organization, enabling our Business Technology team to continually improve, engage, and contribute to business growth."

— Doug Mikaelian,  
VP Business Technology,  
Dairy Farmers of America



## About Cutter Consortium

Cutter Consortium is a truly unique IT advisory firm, comprising a group of more than 100 internationally recognized experts who have come together to offer content, consulting, and training to our clients. These experts are committed to delivering top-level, critical, and objective advice. They have done, and are doing, groundbreaking work in organizations worldwide, helping companies deal with issues in the core areas of software development and agile project management, enterprise architecture, business technology trends and strategies, enterprise risk management, metrics, and sourcing.

Cutter offers a different value proposition than other IT research firms: We give you Access to the Experts. You get practitioners' points of view, derived from hands-on experience with the same critical issues you are facing, not the perspective of a desk-bound analyst who can only make predictions and observations on what's happening in the marketplace. With Cutter Consortium, you get the best practices and lessons learned from the world's leading experts, experts who are implementing these techniques at companies like yours right now.

Cutter's clients are able to tap into its expertise in a variety of formats, including content via online advisory services and journals, mentoring, workshops, training, and consulting. And by customizing our information products and training/consulting services, you get the solutions you need, while staying within your budget.

Cutter Consortium's philosophy is that there is no single right solution for all enterprises, or all departments within one enterprise, or even all projects within a department. Cutter believes that the complexity of the business technology issues confronting corporations today demands multiple detailed perspectives from which a company can view its opportunities and risks in order to make the right strategic and tactical decisions. The simplistic pronouncements other analyst firms make do not take into account the unique situation of each organization. This is another reason to present the several sides to each issue: to enable clients to determine the course of action that best fits their unique situation.

For more information, contact Cutter Consortium at +1 781 648 8700 or [sales@cutter.com](mailto:sales@cutter.com).

## The Cutter Business Technology Council

The Cutter Business Technology Council was established by Cutter Consortium to help spot emerging trends in IT, digital technology, and the marketplace. Its members are IT specialists whose ideas have become important building blocks of today's wide-band, digitally connected, global economy. This brain trust includes:

- Rob Austin
- Ron Blitstein
- Tom DeMarco
- Lynne Ellyn
- Israel Gat
- Vince Kellen
- Tim Lister
- Lou Mazzucchelli
- Ken Orr
- Robert D. Scott