

Knowledge@Wharton – Wipro Future of Industry Series: Advanced Technologies

Unleashing the Power of Advanced Technologies



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Cloud computing, mobility, data analytics, social, and sensors are disrupting established business models and reshaping customer experience across industries. Working in concert, these advanced technologies are eroding barriers to entry, lowering costs of transactions, and increasing speed-to-market. Fragmented user experiences are becoming more intuitive and seamless, with fewer hand-offs and greater continuity across customer touch-points and channels. [Shawndra Hill](#), professor of operations and information management at Wharton, and Shaji Farooq, senior vice-president for advanced technologies at Wipro, weigh the opportunities and challenges that advanced technologies bring in this white paper produced by Knowledge@Wharton and sponsored by Wipro Technologies.



Cloud computing, mobility, data analytics, social, and sensors (referred to as advanced technologies) are disrupting existing business models, forcing organizations to reinvent themselves and transform the way they serve their customers. Together, these technologies have the power to erode entry barriers across industries and shift

competitive advantage as they do so. The pace of innovation that these technologies set is often frenetic, driven by the adoption of open source technologies that harness the collective brain power of development communities and through crowd sourcing.

“Almost anything is possible with these newer technologies working in concert, and often the biggest constraint is the inability to think beyond the tried and tested; one has to be willing to suspend one’s sense of disbelief to truly harness what these technologies can offer – it is like making a sci-fi movie, only this time around

it is for real,” says Shaji Farooq, senior vice president for advanced technologies at Wipro. Farooq heads the company’s global business in advanced technologies, strategic alliances, and also oversees “go-to-market” enablement, which defines his company’s sales and marketing strategies. In addition, Farooq manages an advanced technology consulting group that advises clients on how to harness the power of these advanced technologies.

“The real power of these advanced technologies can be experienced when you bring them together,” says Farooq. “They have the power to disrupt almost any process. And the impact is exponential; think of this as (**Impact**)ⁿ – the more of these technologies you leverage, the greater the overall impact to your business. Together, these technologies allow you to share everything (information, intelligence, insights, and opinions), everywhere, all the time.”

Shawndra Hill, a professor of operations and information management at Wharton, and Farooq explain how these technologies are transforming businesses:

Seamless, Intuitive Experiences: Customer experience today is mostly disjointed and fragmented, and these newer technologies present a tremendous opportunity to change that to a more seamless and intuitive experience. Over the last decade, advances in communication technologies have enabled a unified customer experience across all channels; information from one channel, like a physical store or customer service desk can seamlessly flow to an online or any other channel.

But the newer technologies that enable collaboration and multi-way flow of information can help businesses discover unmet customer needs by understanding the context (where are your customers, what have their historical behaviors been, what do their recent activities imply) through real-time analysis of information, and provide customers targeted services that customers desire (rather than inundating them with unnecessary promotions and offers). Furthermore, the intuitive interfaces for customer interaction enabled by these technologies make formal learning or training irrelevant, notes Farooq.

The following example illustrates how user experience will evolve as these newer technologies take hold:

Sensors in cars today flash alerts about problems that need attention, such as a need for an oil change, or low fluid levels. These alerts usually flash when a driver is at the wheel, a time when it is least convenient to act on such alerts. Consequently, the driver must later remember to call a mechanic, explain the problem, arrange an appointment, and drop off his vehicle for service. When the mechanic hooks up his computer to probe the various sensors in a car to diagnose potential problems, he may discover other things that need to be repaired. And often, the parts required for these repairs are not readily available, requiring a second visit to the

mechanic. “This is what I mean when I refer to a disjointed/fragmented customer experience,” says Farooq.

Cars in the very near future will have a multitude of sensors embedded to detect problems, flash alerts directly to a mechanic of choice, automatically schedule or suggest an appointment with a preferred repair shop, and update your calendar. This will allow the mechanic to pre-order required parts based on the comprehensive diagnostic information that the sensors relay to him, says Farooq. Technologies such as cloud, mobility, sensors, and analytics enable such timely communication and sharing of data across multiple parties involved in the process. It is important to recognize that by working in the background, these technologies have eliminated handoffs, creating a seamless experience for the customer.

Similarly, sensors in aircraft will not only warn pilots about imminent problems, but will also make it possible to optimize scheduled maintenance (location and time of repair) with minimal service disruption and reduced spare part inventories. Sensors built into windmills on windmill farms can be managed with minimal human intervention because of these technologies working together in the background – these self-modulated sensor controlled windmills can cope with high winds by adjusting their blade angles, or shake off ice buildup by accelerating and decelerating, he adds. Packages with intelligent sensors capable of two-way communication will allow re-routing of packages during transit by reprogramming destination information stored on the sensor. Sensors will become pervasive, and embedding them almost anywhere will become cost effective. The primary drivers for this so-called sensor revolution will be the dramatic reduction in the cost of manufacturing them, and the increasingly sophisticated sensor functionality that can

significantly alter the cost of processes and operations in almost any industry.

Sensor data can be used to predict business outcomes for marketing, manufacturing, supply chains and fraud detection, says Hill. She points to the example of sensors being used to monitor health information in real-time to offer personalized care. Sensors in smart phones can “provide a huge opportunity to learn about human behavior in various ways.” However, challenges persist, especially with the sources and the usability of the data gathered. There is a need to find new methods to combine and mine data from different sources and address privacy issues, she adds.

Hill has used sensor data in a variety of ways in her research to study how they can impact a firm’s bottom-line and enhance consumer experience. They range from using satellite data to predict drought in Ethiopia, tracking call behavior to detect telecom fraud, and monitoring social media to measure the effectiveness of advertisements.

Redefining business processes: Technology is getting increasingly standardized, compelling businesses to re-examine what their “core processes” are and where they could derive competitive advantage. The process to secure a housing mortgage loan in the U.S. involves more than a dozen different parties including attorneys for the bank, buyer and seller, inspection and credit rating agencies and real estate agents. Each works in a silo, and over some 40 days, they produce a large set of documents.

Cloud, mobility and analytics could allow all those parties in the loan origination process to work on a single platform. That would force each party to redefine its competitive advantage, says Farooq. For example, the competitive advantage for a bank must stem from its underwriting standards, he explains. The Internet, cloud and

other technologies lower transaction costs, forcing businesses to rethink what activities they consider core and worthy of retaining in-house, he adds.

“Data storage and processing has become democratized, putting the power to perform large scale data analysis at the finger tips of almost anyone with a great idea, the will to learn how to analyze large data and a small budget,” says Hill. In fact, the availability of data mining tools help her and her students wrap up large projects within a semester. For companies, a big challenge in data mining is to find talented people with both the technology and business expertise, she adds.

Crowd sourcing: Notions of core or proprietary strengths are also under attack from open source technologies. Google’s Android operating system for smartphones and tablets is a classic example. About 700,000 Android applications were available as of May 2013. “Many firms have chosen to marry their future to open source technologies,” says Farooq. “By doing so, you automatically become part of the constant innovation that will take place in the future.”

Another example of crowd sourcing Farooq points to is oDesk, a Redwood City, California-based online workplace “where you can literally create a project team on the fly without hiring them permanently on your payroll.” Ten-year-old oDesk has 2.3 million registered contractors and more than 500,000 customers worldwide. It allows users to assemble people with specific skills for limited periods of time, and get them to work in teams or individually.

“Crowd-sourcing helps us to do work cheaper, easier, and faster,” says Hill. She points to its many applications, ranging from getting simple tasks done with an army of workers to voting on elections, stock outcomes and funding work at the micropayment level in the developing world. However, crowd sourcing has limitations with

respect to the quality of work generated and measuring it, and managing a large and diverse set of unskilled workers at scale, she adds.

Hill was involved in launching a large, crowd sourcing competition called the MyHeartMap Challenge to get people in Philadelphia to map automatic defibrillators in the city. She also used stock picks from participants on the Motley Fool Financial website to predict stock performance.

Peer Advocacy Power: Customers want “to hear and be heard,” says Farooq. From that emerges the power of “peer advocacy” and crowd sourcing to extract business value. “Customers trust one another more than they trust the businesses they deal with, and also want their opinions to be heard,” he adds. He points to Covestor, a five-year-old Boston, Massachusetts-based online brokerage firm that builds its business model on those maxims. With the permission of its clients, it validates and exposes the portfolio performance of “model managers” that have produced superior investment returns. Its investor clients could choose to mimic those model managers, who would get a percentage share of the returns for the service that they provide.

Customer opinions on social media help firms learn about their performance, and customers learn about the quality of products and services from one another, says Hill, pointing to one aspect of the power of peer advocacy. “Firms have the opportunity to craft and drive the message that they want consumers to discuss online about their products,” she adds. However,

firms and consumers must be wary of shills, or fake reviews and comments online. Hill has used social media to track brand advertising during major events to monitor responses to brands over time and by demographic category.

FRESH VIEW FROM THE TOP

In order to extract the gains of advanced technologies fully, top managements must realign organizational goals and performance metrics to break silos, embrace collaboration and promote technology integration. “When there is collaboration, there is synergy,” says Farooq. The job of the CIO has to evolve to adapt to the rapid shift both in how technology is deployed and how it will be used – the focus has to shift from managing information and technology infrastructure to enabling business with greater speed and agility. “The ‘I’ in CIO will in the future be a lower-case ‘i’ that emphasizes intelligence, insights and innovation,” he adds.

One should also add “imagination” to that list, says Farooq. “Our greatest limitation is our inability to imagine what is possible, because the technology to do it is there,” he adds. “If you were to ask a kid on the 40th floor of a building what is the fastest way to get to the ground, he would probably say, ‘Jumping out the window.’ But if you tell him that you could die if you did that, he might respond, ‘Not really, because I have this magic suit that will take me down in a manner that will not kill me.’ Today, it is all about daring to dream about that magic suit.”

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