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October 2013

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

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A new world of opportunities to extract competitive advantage awaits businesses at the intersection of new digital technologies. Businesses could gain from "intelligence augmentation" by processing high-volume data from multiple sources for real-time business insights. They could also provide "immersive experiences" by gleaning consumer preferences through gestures, touch and specialized eyewear. Further along are "smart systems," ubiquitous, "always-on" monitoring enterprises, and next-generation nano materials and digital substitutes. Enabling these would be enhanced crowd-sourced "open-execution" models to develop the desired technologies.

Anurag Srivastava, chief technology officer at Wipro Limited, and Shawndra Hill, Wharton professor of operations and information management, explain how businesses could calibrate and monetize their investments at that digital intersection.

An "exploding universe of ideas and experiments" and an "unprecedented multiplier effect" beckon businesses at the intersection of digital technologies, according to Anurag Srivastava, chief technology officer at Wipro Limited. Individually, technologies like cloud computing or big-data analytics have demonstrated big gains, but the potential is far greater if they are used in innovative combinations, he explains. They are "sparking a daring new era in the way we interact, communicate, collaborate and conduct business." Srivastava visualizes nothing less than a "Big Bang … when universes collide and absolute magic is created," offering "ground breaking ways to solve problems." Technology infused with innovation, termed "technovation," is the emerging new order, he adds.

Srivastava cites YouTube, launched in 2005, as an early example of an opportunity made possible by digital convergence. "The rich media social network was born at the intersection of the Internet, cheap video cameras, data compression technology, easily available storage, widely accessible computing power and autonomous self-publishing, annotation, content promotion and commenting systems."

Digital technologies are also making it possible for people and organizations to sell excess resources, says Shawndra Hill, Wharton professor of operations and information management. She points to Amazon Web Services, launched in 2006, that monetized spare capacity across multiple remote computing devices by pooling them to offer a cloud platform that claims lower costs and faster speeds than conventional server farms. She also cites San Francisco-based Airbnb, which enables individuals to list online and rent unoccupied lodging such as spare rooms or even a couch to frugal travelers.

FIVE LEVELS OF CHANGE

Going forward, Srivastava forecasts five scenarios where the intersection of digital technologies will create new businesses opportunities:

- **Intelligence augmentation:** The first level will manage high volumes of data with low storage costs, adopt large-scale data processing technologies, blend multiple sources of data, extract intelligence using machines and visualize the data based on domain and context.
- **Immersive (or virtual reality) experience:** This involves consumer preferences articulated through gestures, touch and specialized eyewear, digital money transfers and crowd sourcing of designs. Augmented reality glasses (e.g. Google Glass) can strengthen communications in aviation, mining or drilling operations to overcome disturbances such as noise or fumes, while data visualization, with tools like 3-D graphics, enhances that further. Many such applications are currently in proof-of-concept development stages.
- **Smart systems:** These include tools to monitor equipment data; health monitoring and emergency responses; self-organizing supply chains and environmental tracking.
- **Ubiquitous Enterprise:** Businesses will use devices and sensors in massive, hyper-connected networks, and maintain 24/7 "always on" computing systems without downtimes. For example, IT resources could help provide real-time responses to business model changes and M&As.
- **Next-generation materials and manufacturing:** This final level will see businesses use digital substitutes (streaming music is an early example), 3-D printing, eco-efficient products, nano materials and bio-synthetics in medical research.

Srivastava and Hill offer some examples of businesses profiting from combining multiple digital technologies:

- In an ongoing project in India, mother and infant mortality rates are witnessing a dramatic fall. Here, fetal monitors with sensors connect through Bluetooth or RF (radio frequency) technology to phones or cloud-based applications with medical experts at the other end. Six urban hospitals are using this process to monitor risky pregnancies and are delivering "really good results," says Srivastava. People in urban settings are willing to pay for "peace of mind," so monetization is not an issue, he adds. He says the model could work in rural India, where nurses could use ultrasound equipment to track patient conditions and use handheld devices to communicate with health practitioners.
- Sproxil, a firm founded by Ghanaian entrepreneur Ashifi Gogo, is helping developing countries combat counterfeit drugs with a combination of bar coding, mobility, the Internet and databases. This is how it works: Buyers of medicines scratch a bar code to reveal a code and then send that code over their mobile phones to Sproxil's database, which immediately responds saying whether the drug is authentic or spurious. Gogo launched Sproxil in Nigeria three years ago and plans to expand to India and Kenya.
- A U.S. company that outsources its travel and expense settlement process reduced the head count at its outsourcing partner from 200 to seven using a combination of new technologies. It overhauled the entire process from booking flights and hotels and creating itineraries through to employee claims settlement. It used a mobile application that scans each bill at creation and a back-end process to record travel plan changes, requiring employees to make all payments through one or two cards.
- A U.S.-based manufacturing company cut the time for a global product launch from between 24 and 36 months to 12 months. It used a combination of collaborative tools including 3-D prototyping in product design and pre-release feedback from social channels.

EXTRACTING RETURNS ON DIGITAL INVESTMENTS

To extract full value from investments in digital technologies, businesses must be willing to change their business processes, says Srivastava. They can often expect returns over a 12- to 18-month window, especially with new service offerings and the higher margins they offer, compared to product margins, he adds. Firms that exploit the "combinational value" of those technologies with process changes could see revenue/cost gains of up to two times in best-case scenarios, he claims.

Hill says businesses must confront some questions up front before making investments: First, how exactly will they derive value from combining multiple data sources such as social networks and transaction/location information to make better predictions or better visualizations? Second, are they agile enough to take advantage of the technologies that change rapidly? Third, should they invest in the technologies themselves or pay somebody else to do it?

'OPEN EXECUTION' THE WAY TO GO

Srivastava advocates an "open execution model" to create applications around digital technologies. That model is a way of opening up application development to a large external group, including employees, he explains. It is anchored in a specific customer need or a business case, and is a refinement of conventional crowd sourcing that provides only broad and generic ideas, he adds.

Hill says it is encouraging to see companies allowing their technology developers to provide open source solutions to their problems they encounter. "While firms are still keeping their core algorithms close to the chest, they are allowing their employees to be part of a community that shares software," she says. "This sharing has tremendous value when pushing data-intensive solutions forward."

THE ROAD AHEAD

In the near term, Srivastava expects organizations to focus on improving customer experiences and "reducing the friction between the virtual and the real world." Banks, for example, could digitize solutions to numerous customer requests (such as opening and closing of accounts, requests for statements and checkbooks, etc.), he says.

In the medium term, he sees businesses investing in "process dissipation" by improving or re-engineering existing processes and eliminating those that are time-consuming and costly. For example, a bank investing in digital strategies might revamp the services it provides at branches to both make the "branch experience" superior for customers and better monetize its investments there.

In the long term, businesses need to find opportunities for new or enhanced products, and focus on the convergence of consumer-facing technologies like smartphones or other devices with networks and networking technologies, while incorporating social and behavioral changes. A bank, for example, might give branch customers iPads to browse through its offerings, allowing its executives to simultaneously track their needs or preferences and present suitable products or services. "You could convert that opportunity into a deal by offering a discount or a promotional offer, since the customer is already in the branch," says Srivastava.

This article was produced by Knowledge@Wharton, the online business journal of The Wharton School of the University of Pennsylvania. The project was sponsored by Wipro Technologies.

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