Recapping 2014, Envisioning the Future

Welcome to the Accenture Technology Labs FY14 report. It has been a year of tremendous progress, and we are pleased to share the results the Labs have achieved to help drive business growth and enhance our technology differentiation by enabling Accenture with cutting-edge technology innovations.

We kick-started the year by implementing a strategic plan that achieved four critical goals:

• Improved our integration with Accenture across our businesses and five Operating Groups.

• Reconfigured our Labs' R&D groups to Accenture's Technology strategy: those groups are Data Insights, Digital Experiences, Infrastructure & Systems, Security and Software Engineering.

• Introduced four multi-year strategic innovation initiatives—Digital Customers, Digital Workforce, Industrial Internet of Things and Intelligent Application Delivery.

• Created Accenture Open Innovation, which taps into the global innovation ecosystem and brings insights from corporate R&D, universities, start-ups and venture capitalists to Accenture and our clients.

In addition to these initiatives, we released our annual cornerstone piece—the Accenture Technology Vision—which identifies the hottest technology trends that are relevant to our enterprise clients.

This report showcases select examples of our Labs projects around the world. Behind each of these stories is a committed group of bright and innovative researchers and thinkers who are collectively helping direct the future of Accenture and the Global 2000 companies and governments we are privileged to call our clients.

Prith Banerjee, Managing Director, Global R&D, Accenture

Michael Redding, Managing Director, Accenture Technology Labs
Accenture Technology Labs

Accenture Technology Labs, the dedicated technology R&D organization within Accenture, explores new and emerging technologies to create a vision of how technology will shape the future and invent the next wave of cutting-edge business solutions. Working closely with Accenture’s global network of specialists, Accenture Technology Labs help clients innovate to achieve high performance. The Labs are located in Silicon Valley, California; Sophia Antipolis, France; Arlington, Virginia; Beijing, China and Bangalore, India.

OUR FIVE R&D GROUPS:

DATA INSIGHTS
Identifies technologies that help improve an enterprise’s ability to extract insights from data.

DIGITAL EXPERIENCES
Develops technology concepts to increase engagement with customers and employees by applying emerging technologies and pioneering engagement strategies.

INFRASTRUCTURE & SYSTEMS
Develops frameworks and tools, and helps create services that provide the self-aware, self-managed and self-healing infrastructures and systems that are crucial to support scale and agility.

SECURITY
Incubates and launches technology solutions that help organizations improve the way they operate in a highly adversarial environment.

SOFTWARE ENGINEERING
Embeds intelligent automation in the software development life cycle.

STRATEGIC INNOVATION INITIATIVES
The Labs has established four Strategic Innovation Initiatives, which focus on long-term, disruptive areas that we believe will transform how businesses operate, engage with customers and grow:

- Digital Customer
- Digital Workforce
- Industrial Internet of Things
- Intelligent Application Delivery
Global Technology Research & Development

LAB LOCATIONS

Arlington — San Jose — Sophia Antipolis — Bangalore

RESEARCH & DEVELOPMENT GROUPS

Cyber Security — Infrastructure & Systems — Data Insights — Digital Experiences — Software Engineering

STRAategic INITIATIVES

Industrial Internet of Things — Digital Customer — Digital Workforce — Intelligent Application Delivery

ENABLING FUNCTIONS

Technology Vision — Open Innovation — Innovation Workshops

SAMPLE PROJECTS

- API Management
- Drone-based Pipeline Inspection
- Smart Grid Analytics
- Traffic Congestion Optimization
- Data Acceleration
- Log Content Analytics
- Visual Literacy (Data Visualization)
- Customer Genome
- Digital Operations
- Wearables
- Social Collaboration
- Financial Services Digital Advisor
- Threat Intelligence
- Security Analytics
- Active Defense
- Cloud Migration Tool
- Intelligent Text Analytics
- Automatic Requirements and Test Generator
MISSION: To differentiate Accenture through technology innovation

OBJECTIVES:
- Brand Awareness
- Business Enablement
- Technology Differentiation

METRICS:
- Labs: 5
- University Relationships: 20+
- Researcher: 200+
- IDF's Filed: 40+
- Blog: #2
- Proof of Concepts: 50+
- POVs & Whitepapers: 70+
Creating the Next Generation of Mobile Commerce (mWallet)

Accenture Technology Labs in Sophia Antipolis worked jointly with Accenture Mobility and Accenture Payments Services to develop the next generation of the mobile commerce platform on top of the Digital Connected Product Platform (DCPP). The Accenture Mobile Wallet (mWallet) was extended with additional features, including beacons, audio tagging and social media integration. The new solution was successfully showcased at key Financial Services events such as 2014 SIBOS and Money 2020.

The insight-driven mWallet platform combines advanced analytics and big data capabilities with recommendation tools and security features to provide a robust, modular platform that supports a trusted digital payments ecosystem. The platform enables end users to manage and operate all their card transactions and payments and to transfer money to other users or future users, reducing the need for any other financial transaction tools. The joint developments between Accenture Mobility and Accenture Technology Labs are based on the API management layer of the DCPP platform that easily supports innovation and new developments.

The counterpart merchant application—mDashboard—was built from the ground up to help small- and medium-size businesses and merchants run their business in a completely digital and connected environment. This includes enabling new payments methods (beacons, proximity, audio tagging), loyalty campaign management, live couponing based on proximity, and suggestions for coupons and campaigns.
Putting Wearables to Work with Google Glass™

Accenture Technology Labs partnered with Philips to develop cutting-edge applications and proof of concepts for wearable devices. Earlier this year, we developed a **proof-of-concept demonstration** that uses a Google Glass head-mounted display for researching ways to improve the effectiveness and efficiency of performing surgical procedures. The demonstration connects Google Glass to the client’s solutions and proves the concept of seamless transfer of patient vital signs into Google Glass, potentially providing physicians with hands-free access to critical clinical information.

More recently, the Labs led a successful collaboration to develop an exciting new wearables platform **proof of concept**. The platform integrates a wearable display with a brain wave scanner—the Emotiv Insight—to enable ALS (Lou Gehrig’s disease) patients to live an independent life by controlling the world around them with their brain waves, eye movement and voice.
Bringing Digital Banking to India

Accenture Technology Labs in Sophia Antipolis supported the design and deployment of the digital banking agenda for one of the major banks in India. The client selected Accenture to design the future banking experience for retail Generation Y customers to engage more deeply with the bank, both through traditional channels (branches, ATMs) and digital channels (mobile, social).

In 12 weeks, Accenture launched the project in seven next-generation digital branches and rolled out more than 20 concepts supported by digital technologies. Chief among these were enabling instant account opening and debit card printing to improve customer acquisition; allowing digital signatures to accelerate banking services; installing interactive tables to provide financial planning and interactive walls to offer loan applications for cars and education; launching mobile client onboarding; and experimenting with a social media wall to communicate with existing and potential customers.

The Labs was engaged through multiple phases of the project—from early discussions with the client to the build phase in which the team selected existing assets and accelerators.
Proving a Data Acceleration and Visualization Hypothesis

The Accenture Technology Labs' Data Insights R&D group partnered with Accenture Analytics to develop an industry-changing hypothesis: by combining the often-siloed data science disciplines of architecture, analytics and visualization, an organization could exponentially multiply the value of its data. The group set out to prove the hypothesis, first by publishing the Data Acceleration point of view to provide the theory behind it, and then by methodically advancing on each discipline, using Accenture's own data.

With a working architecture proof of concept, the Labs enriched the data with a patent-pending log content analytics approach, which enabled users to see the data in a previously unexplored way. The next step was to create an interactive data visualization to illustrate the patterns and anomalies in the data, even to a novice in the field.

The process of moving through architecture, analytics and visualization with a single data set helped prove the original hypothesis and resulted in a Data Acceleration demo for use with our clients.
Getting the World to Talk about Data

Accenture Technology Labs’ Data Insights R&D Group helped spark many public conversations around data and the value of data insights, illustrating how best to leverage emerging architectures, novel analytics and design thinking concepts to enhance the value an organization can expect from its data supply chain.

The group's thought leadership on data architecture and visualization was featured in some of the world's leading technology journals and blogs, including:

• **Hotshotcharts.com**, an advanced interactive visualization of the NBA’s 2012 season, in [Wired.com](http://Wired.com) magazine.

• Point of view on [big data in the cloud](http://bigdatainthecloud.com) in Google's cloud blog.

• In collaboration with the Accenture Institute for High Performance, a story in The Wall Street Journal (Dow Jones & Company, Inc.) on [how to build better data science teams](http://howtobetterdatascienceteams.com).

• **Disasterviz.com** in the Koshland National Academy of Science Museum in Washington, D.C., to help demonstrate the environmental resiliency of the US.
Strategizing with High Tech Manufacturing on Internet of Things Solution

When a high tech manufacturer identified the Internet of Things (IoT) as a key growth platform, it turned to Accenture to help capture the IoT market. Accenture Technology Labs partnered with Accenture Digital to develop the client's strategy and use cases as a series of prototypes or solutions for key verticals. In particular, the Labs led an architecture team for the first IoT engagement with the client that successfully delivered the technical requirements for a key IoT commerce solution.

The Labs' pioneering work in unmanned aerial vehicles (UAVs) was also heavily leveraged as the foundation of the joint proof-of-concept prototype with the client to support remote asset monitoring.
Seizing Key Opportunities via Smart Grid Offerings

Accenture Technology Labs has been working to encode intelligence and analytics into Accenture’s Industrial Internet of Things (IIoT)-related service offerings. Intelligence is a critical element of the IIoT. Highly sensated products collect and share information about how they are being used and the environment in which they are operating. Manufacturers can use this information in one or more ways: to provide smart services to optimize products; to diagnose and predict potential issues; or to provide insight on how to build better products and services.

As just one example, the Labs developed analytical models for the Accenture Utilities industry that allow utility companies to best utilize their assets and services. Examples include dynamically routing electricity to where it is needed most to reduce potential brownouts, automatically identifying potential electricity loss due to theft, identifying the root cause of equipment problems, and predicting potential equipment failures. To create these models, the Labs correlated machine data with external data to provide a 360-degree view across equipment, customers and employees.

These techniques have been successfully applied at various electrical utilities in Asia Pacific, allowing them to recover lost revenues, increase operational efficiency, and improve quality of service and overall customer satisfaction.
Defending the Digital Business with Intelligent Security

Intelligent security enables companies to more effectively manage business risk. Drawing on research by Accenture Technology Labs, the innovation brings together threat, security analytics, orchestration and active defense into a business model that transforms both security operations and business risk management. Intelligent security provides companies with the method and the roadmap to move from traditional cyber defenses toward a proactive position that is aligned with an organization’s business objectives.

The Labs’ strategic work on intelligent security has set the foundation for a new level of engagement with our clients, thinking outside of the compliance box, identifying leap-ahead opportunities, uncovering hidden risks and keeping pace with persistent threats. For more information, see our point of view “Defending the Digital Enterprise.”
Boosting Crop Yield for Smallholder Farmers

Global agriculture practices increasingly must rely on up-to-date scientific knowledge. Smallholder farmers, who provide 80 percent of the food supply in Asia and Africa, are the most vulnerable since it is more difficult for them to access the necessary information.

Accenture Connected Crop Solution (ACCS) for Smallholder Farmers is a producer–services solution aimed at small-plot and emerging-geography farmers to enable personalized crop management. Developed by Accenture Technology Labs, the solution provides connectivity through mobile devices and other established mediums to link producers to labs, agents, nutrient suppliers, insect control suppliers and others. ACCS helps smallholder farmers gain access to knowledge about which fertilizers and pesticides to use and when, resulting in increased crop yield, more profit for all stakeholders and sustainable economic development.

Accenture was engaged by a leading agro-input company that manufactures and distributes fertilizers, plant nutrients and soil conditioners across Southern India to implement ACCS and conduct a pilot project. The client has achieved significant improvements in agent productivity, product sales and farmer crop yield using ACCS. The structured sales process, supported with a wide-reaching digital solution, is a growth platform for the client and for modernizing agriculture among today’s most challenged farmers. Among those who participated in the pilot, crop yields grew by an average of 15 percent, with improvements for some cash crops exceeding 30 percent. For smallholder rural farmers, these gains can make a significant difference in their lives.
Building Innovative Cloud and Diagnostics Solutions with Salesforce

Accenture Technology Labs' Software Engineering group is creating intelligent tooling in Salesforce with the aim of delivering high-quality cloud solutions to clients.

One of the new tools is Accenture Software Engineering Suite for Salesforce (ASESS), an asset that scans the custom code in Salesforce to identify best-practice violations like exceeding governor limits and other code quality issues. It also identifies security vulnerabilities such as the potential for injection attacks, cross-site scripting and cross-site request forgeries. ASESS has a test generator module that automatically generates unit tests and test data for all public methods, thereby significantly increasing code coverage. This tool has been deployed to 150+ client projects across Accenture.

Following the success of ASESS in custom Salesforce, the team created Configuration Tester for Salesforce, which analyzes the various configurations—including validation rules, lead assignment and case assignment—to automatically generate unit tests and test data for the same. A global insurance company and a global industrial manufacturer enlisted for early pilots and validated the impact potential of the innovation.

The Labs' team also worked to create Accenture Systems Diagnostics (ASD) for Salesforce. This tool, which is hosted on the Heroku platform, has powerful visualizations to discover prominent objects based on their complexity and influence, along with connection maps across all the Salesforce objects, with a detailed 360-degree drill down of object attributes. Certain large retailers and a major agro-business were the early adopters of this innovation.
Detecting and Preventing Blindness through ACES

Blindness is a major concern in India, with one-fourth of the global blind population living in the country. To help address this issue, Accenture Technology Labs in India was involved in shaping the Accenture Connected Eye Care (ACES) platform. The solution automates the process of accessing data to generate electronic medical records of patients, and is designed to help eye hospitals, predominantly in rural areas, conduct their outreach programs effectively.

The project began with a leading eye care hospital chain in Southern India, which had many challenges in delivering services to patients in the region. The Labs supported ACES through extensive field research with the hospital, solution conceptualization, development using novel engineering techniques and a subsequent field trial, in which more than 700 patients were screened using ACES.

Today, ACES is helping the eye care hospital improve operational efficiency through real-time data monitoring and data visualization. With a strong analytics engine, the solution generates regular reports that summarize households covered, people registered, people referred to eye camps and number of patients for whom vision is restored; it also produces monthly reports on performance and targets achieved. Using ACES, hospital management can now accurately measure the effectiveness of surveys and eye camps along with the overall impact of the entire outreach initiative.
Launching Accenture Open Innovation in the Start-up Ecosystem

Accenture Technology Labs launched Accenture Open Innovation to serve as a bridgemaker between our Global 2000 clients and the global technology innovation ecosystem, which includes start-ups, universities, corporate R&D departments, venture capitalists and more. The objective is to connect our clients to enterprise-relevant technology innovators and provide Accenture consulting, technology and operations skills to help them meet their business transformation objectives through guided disruption. At the same time, we connect our innovative technology partners to growth opportunities with our pioneering clients.

In the first year of operation, Accenture Open Innovation accomplished a number of key goals:

- Identified and tracked 300+ industry-specific start-up companies exploring innovations such as digital, Industrial Internet of Things and mobility.
- Established strong relationships and conducted portfolio reviews with the top venture capitalists in the Silicon Valley.
- Completed trend discovery reports with start-up accelerator RocketSpace, Inc.
- Hosted events and meet-ups at RocketSpace's technology campus about topics such as digital-physical blur and corporate—start-up partnerships.
- Initiated an engagement program with Stanford and a preliminary program with CAL.
- Started joint R&D engagement discovery sessions with leading corporate R&D labs.
- Sponsored TechCrunch Disrupt 2014 in San Francisco and won the “Best Enterprise Disrupter" award.
Envisioning Our Future: Technology Vision 2014

In early 2014, Accenture released the Accenture Technology Vision 2014: From Digitally Disrupted to Digital Disrupters. Produced annually, the signature report defines and explores key IT trends that are shaping the future of business in the next three years.

This year’s interactive, online report examined the pace and effects of the race to become digital, and specifically discussed how global giants are leveraging their scale and resources to resume the role of disrupter and begin to surpass digital pure plays. The six trends covered in depth include Digital-Physical Blur from Workforce to Crowdsourse, Data Supply Chain, Harnessing Hyperscale, Business of Applications and Architecting Resilience. Each trend also includes a 100-day and a one-year plan of next steps businesses can take.

The Accenture Technology Vision 2014 is currently the #1 download on accenture.com.
A high-profile Internet retailer approached researchers from MIT, Accenture Technology Labs and Accenture Alliance in Business Analytics to tackle two challenges: 1) predicting demand for items that had not been sold by the client before, and 2) optimizing prices to maximize revenue.

Together, the project team focused on the development and implementation of a pricing decision support tool, with data analysis to optimize daily pricing decisions to maximize revenue. Using regression trees with bagging to provide optimal demand predictions, the Labs applied a novel reformulation of the price optimization problem to handle the regression tree outputs and to produce an efficient algorithm for pricing next-day items.

The Internet retailer has adopted this pricing tool, and early results suggest a 10 percent lift in revenue with negligible impact on sell-through. As added recognition, the work won the INFORMS Revenue Management Award in June 2014.
Improving Oil Operations with Intelligent Digital Process

Accenture Technology Labs teamed up with Avanade and the Accenture Resources industry to help a North American oil and gas company explore new ways for distributed teams to leverage digital technologies to transform how they manage the operation of a large collection of oil wells.

Our joint team developed an innovative proof of concept that brought together collaboration, enterprise social and mobile technologies with Industrial Internet of Things concepts to create an "intelligent digital work process."

The system uses common social and real-time collaboration channels to transmit automated alerts from sensors. This information is filtered to the right people based on their role in the company's work processes. When a coordinated response is needed, the system recommends who should be involved and then automatically records all subsequent actions. With the intelligent digital work process, the client's operational team can more easily monitor wells and related equipment, rapidly coordinate a response, and capture their experience to help improve the practices of other teams throughout the organization.
Implementing Digital Talent Broker at Accenture

Accenture Technology Labs took two important steps toward enabling an even more dramatic workforce transformation of Accenture and our clients’ work processes in the spirit of the “Workforce to Crowdsourse” element of the Accenture Technology Vision 2014.

First, the group deployed a proprietary internal crowdsourcing tool called Digital Talent Broker, a web-based application that creates an electronic marketplace designed to connect unstaffed employees available to do work with project teams who need help on their projects. In its initial pilot, Digital Talent Broker has brokered more than 2,000 hours of internal Accenture work effort.

Second, the team developed partnerships with key crowdsourcing vendors and experts, and began planning crowdsourcing pilots in several key areas of Accenture's business, including application development, and testing and operations.
From Looking Digital to Being Digital

The Labs' Digital Workforce group teamed up with the Accenture Institute for High Performance to produce a series of publications, including two articles in the Accenture Outlook journal, a research report and 10 case studies describing how leading companies are using digital technologies to transform the way work in the enterprise gets done. The thought leadership pieces have been used to help shape the way that both clients and Accenture think about leveraging digital technologies to change the structure of their work processes. The transformation framework has also enhanced the Digital Workforce Innovation agenda, giving rise to several internal and client projects. A collection of “From Looking Digital to Being Digital” resources is available at “Impact of Technology on the Future of Work.”
Explozing the Potential of Secure Unmanned Operations

Accenture Technology Labs’ Secure Unmanned Operations project is focused on helping organizations digitally task and oversee a machine workforce of remote operated vehicles, fixed sensors or collaborative robots. Augmenting the human workforce with these Industrial Internet of Things technologies can help companies reduce costs, improve productivity and make business processes safer while maintaining continuity of service.

During the past several years, unmanned aerial vehicles (UAVs)—also known as drones—are increasingly being deployed in commercial demonstrations. UAVs have shown early signs of strong business value in several applications, including monitoring irrigation levels in agricultural fields and conducting airborne inspections of manufacturing and production facilities.

Accenture is working with various clients to devise UAV strategies and determine how best to apply this innovative technology to improve business operations. Accenture Technology Labs and Accenture Digital are actively developing UAV capabilities through R&D activities and are exploring use cases and pilots with several early adopters, including companies in the Energy industry. Anticipated benefits include reduced exposure to hazardous environments, increased efficiency and effectiveness, and optimized operations.
Using UAVs in the Energy Industry

In the Energy industry, asset management and monitoring is critical to assess production performance, environmental and safety compliance, and overall integrity. The complexities, risks and scale involved are immense: pipelines span thousands of miles, manufacturing facilities offer potential exposure to hazardous chemicals and production platforms are often remote, for example, in deep-water and arctic environments. Maintenance, integrity and surveillance activities are costly to plan and execute, yet must be done routinely. UAVs offer an attractive complement to conventional approaches to facility management.

Accenture Technology Labs developed a proof of concept that demonstrates how UAVs take off, navigate a designated route, capture data using onboard cameras and sensors, transmit that data, and return to home base—all without human interaction. By applying analytics and digital image processing, the mission operator is able to review the mission in progress and alerts raised through analytics, then alter the flight plan in real time to further inspect the problems identified. For more information, see our point of view “It’s Time for Flying Robots.”
Expediting Software Development with Accenture Requirements Analyzer

The flagship asset from the Labs’ strategic innovation initiative related to Intelligent Application Delivery is Accenture Requirements Analyzer (ARA). The asset is a next-generation requirements analysis tool that leverages Accenture’s deep industry knowledge for advanced quality analysis of software requirements documents. ARA uses advanced natural language processing techniques, model-based analysis and statistical rules for requirements analysis. The product-grade asset is engineered for performance and incorporates several patent-pending innovations.

ARA has features for identifying glossary terms, acronyms and expansions, inconsistent use of terms, ambiguous words and phrases, and non-functional requirements. It facilitates audit and compliance checks, industry knowledge-based requirements analysis and generates test artifacts, including test scenarios, test conditions and expected results from requirements documents.

With its superior technology and industry models, ARA has the potential to expedite requirements analysis significantly, thereby improving quality and time to delivery for Accenture and bringing direct benefits to clients.
INTELLIGENT APPLICATION DELIVERY

Guiding the Digital Journey with the API Maturity Model

A key element of a digital platform, application programming interfaces (APIs) allow companies to quickly create new interaction channels, interface with partner organizations and generate new revenue streams by providing digital services externally. Many of Accenture’s clients are in the midst of their digital transformation. To help accelerate their journey, Accenture Technology Labs created the API Maturity Model, which clients can use to assess where they are in the journey and identify what their best course of action should be.

The API Maturity Model—along with an interactive, web-based assessment and recommendation tool—was broadcasted through internal and external webinars. In the first month, the webinar was viewed by over 600 people and the material was externally downloaded almost 2,000 times. It immediately garnered interest from API communities, ranging from media companies to some of our best clients. The piece strengthened Accenture’s leadership position in Digital Transformation and directly contributed to multimillion dollar client sales.
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About Accenture

Accenture is a global management consulting, technology services and outsourcing company, with more than 305,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world's most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US$30.0 billion for the fiscal year ended Aug. 31, 2014. Its home page is www.accenture.com.

About Accenture Technology Labs

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