Board Strategic Development Committee and Special SMUD Board of Directors Meeting
Tuesday, October 16, 2018, scheduled to begin at 5:30 p.m.
Customer Service Center, Rubicon Room
Agenda

1 The Innovation Aperture

2 Technology Trends

- **Working with Machines — Bots and Augmented Reality**
  - Execution of repetitive workflows – The no-collar workforce
  - The customer experience with chatbots
  - Augmented and Virtual reality

- **Going Digital: Analytics and Big Data**
  - Customer Analytics
  - Analytics and the Grid

- **Blockchain**
  - Frictionless transactions
  - Energy trading

3 Value Creation
Meeting with you today

**Tim Boehm**  
Principal  
Consulting Enterprise Operations

**Jian Wei**  
Principal  
Core Business Operations

**Dave Skvarna**  
Managing Director  
Client Experience
Digital is changing the way businesses think, work and operate
Innovation: What is Your Digital Ambition?

Transformational innovation sees the highest return on investment.

- **Average balanced portfolio**
- **Return on investment**
Working with Machines
RPA vs. Cognitive vs. AI

RPA
- Systems that DO
  - Speech to Text Conversion
  - Robotic Process Automation
  - Data Ingestion

Cognitive
- Systems that THINK
  - Image & Speech Recognition
  - Smart Sensors
  - IT Process Automation

AI
- Systems that LEARN
  - Natural Language Processing
  - Machine Learning
  - Sentiment Analysis

Structured Data
Simple Rules
Unstructured Data
Complex Rules
What is RPA

RPA software provides advanced macro-like capabilities that can be deployed at an enterprise or business unit level.

**RPA is...**
- Computer-coded software
- Programs that replace humans performing repetitive rules-based tasks
- Cross-functional and cross-application macros

**RPA is not...**
- Walking, talking auto-bots
- Physically existing machines processing paper
- Artificial intelligence or voice recognition and reply software

**Evolving from RPA to ML and AI**
- Bots are trained (ML) based on process "exceptions"
- Bots make decisions based on externally available data and programmed algorithms, allowing them to adjust to changing circumstances

What is a chatbot

A chatbot is a piece of software that enables devices to converse with humans through speech or text, conversational input, respond appropriately, and perform or allocate a task.

**Chatbots are...**
- Intelligent electronic agents
- Based on rapidly evolving natural language processing
- Human interface that can also execute tasks

**Evolving Chatbots to ML and AI...**
- Chatbot is taught correct interactions based on successes and failures
- Physically existing machines processing paper

**Customers engage with chatbots**
- 69% At least once a month
- 31% Less than once a month
Bots Can Improve Business

**Simple Use Cases**
- Opening email and attachments
- Logging into web/enterprise applications
- Moving files and folders
- Copying and pasting
- Filling in forms
- Reading and writing to databases
- Scraping data from the web
- Connecting to multiple systems
- Making calculations
- Extracting structured data from documents
- Collecting social media statistics
- Following “if/then” decisions/rules

**Sales & Marketing**
Chatbots can be used to follow-up on customer satisfaction, execute promotional campaigns and manage social media.

**Customer Support**
Chatbots can handle routine questions and tasks, freeing up more time for staff to deal with more complex, value-added services.

**Partners**
Like customer support, Chatbots can handle simple partner demands in a more efficient and convenient manner.

**Employee Assistance**
Chatbots can provide HR assistance, train new employees and provide pre-filled and predictive answers for call center agents.

**Customer Insights**
With the extensive data tracked by chatbots, numerous departments can use their insights to improve their offerings.
RPA Video

Automation of Exceptions in Utilities

Deloitte Consulting India Pvt. Ltd.
Augmented & Virtual Reality

**Digital Reality**

- **360° Video**: Provides a new perspective that allows users to look every direction.
- **Augmented Reality**: Overlays digitally-created content into the user’s real-world environment.
- **Immersive**: Creates multisensory, digital experience and is delivered through any of these technologies.
- **Mixed Reality**: Blends digital content into the real-world and creates an environment where both coexist and interact.

**Augmented & Virtual Reality** solves real-world business problems and creates new sources of competitive advantage.

*Based on Consumer Technology Association Definitions, 2016*
Creating Value

VR and AR enables interactive and sensory content with the disruptive potential to recast long-standing business processes and tasks, truly enabling us to understand the relationship between our actions and the perceivable results.

**Learning + Practice**
- Go beyond the tell, drive the nuanced skills, values and lessons learned of the exemplary performer through virtual tacit learning
- Consequence free trial and error reduces speed to expertise
- Reset perspectives (purpose, values, focus) based on the learning objectives and activities
- Reinforces desired skills, behaviors and attitudes through rewards and repetition

**Change Adoption**
- Model a system, immerse the user and demonstrate via action and outcome the impact, both individually and organizationally
- Embrace the change through ownership and buy in...in the context of execution

**Visualizations + Analytics**
- The more real...the more impact, representing real life in high fidelity (multi sensory) yields honest reactions
- Choices are manifestation of skills, attitudes, tendencies, bias...each can be collected and used to support the individual or organization

**Work Augmentation**
- Provide "eyes-up" access for real-time support in performing a task
- Provide augmented visibility to assist in the performance of tasks
- Provide expert assistance during the execution of an activity
AR Equipment Troubleshooting Tool
Working with Machines: Implications

The no-collar workforce will require a shift in thinking across several areas, including:

- Culture—on/off campus
- Tech fluency
- HR for humans and machines
- Cybersecurity, legal, and regulatory
Going Digital: Analytics and Big Data
What is Cognitive Analytics and Artificial Intelligence

Using data to drive better insights and performance is not new. It’s evolving, with “table stakes” analytics capabilities in high demand and organizations exploring new possibilities.
Creating value

AI models have the potential to substantively change the way we work, depending on deep statistical learning that becomes increasingly efficient and precise over time.

**Creates new business opportunities**

- AI, and cognitive technologies allow businesses to build efficient and advanced models to tackle large and complex problems
- **Enhanced Spend Visibility** – gain faster, more accurate, and more detailed classification; more easily navigate spend by category, supplier, business unit and geography

**Augments human intelligence**

- AI can expand the problem-solving process of experts, outperforming them over time
- By freeing up human resources, AI can allow employees to focus on higher value tasks

**Grid analytics**

- Utilities are moving towards making significant improvements to their outage management by reducing the length of outages and improving ETR. As a result, they are deploying IoT platforms and distribution automation which need analytics based on spatial-temporal and networks. Deloitte is helping utilities move these next generation architecture.
While a lot of shop floors have all the data available for efficient decision making, the key to predict the machine failures lies hidden in the noise. Predicting those failures ahead of time will help prevent downtime, additional costs and long term damage. Extracting information from this huge data is like finding a needle in a burning haystack, especially when time is of the essence.

SOLUTION
Deloitte's use case of “Live Enterprise – Predictive Maintenance” built on top of SAP Predictive Maintenance and Service provides a holistic management of asset health and decision support for maintenance schedules and the optimization of resources based on health scores, anomaly detection, and spectral analysis.

IMPACT
• Improved asset utilization via reduction of unscheduled asset downtime and extending the useful life of assets
• Increased machine uptime can contribute to improved productivity and increased revenue
• OEMs can serve customers better by monitoring customer assets and providing timely maintenance.
• Move towards a service-driven business model over a product-driven business model, with a higher guarantee on asset longevity and utilization
Blockchain
What is Blockchain

Blockchain is a digital ledger system that impacts all transaction fabrics in modern world. It can be used for recording business transactions, transferring value and enabling programmable business logic.

### Features
- Near Real Time
- No Intermediary
- Distributed Ledger
- Irreversible
- Censorship Resistant

### Purpose
- Record Keeping
- Transfer of Value
- Smart Contracts

### Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Characteristics</th>
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<tr>
<td>Public Blockchain</td>
<td>• Fully decentralized – requires very low trust&lt;br&gt;• Fully transparent – Anyone can read, send transactions and participate in the consensus process&lt;br&gt;• Blockchains are secured by economic incentives and cryptographic verification; Low cost for transactions</td>
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<td>Permissioned Blockchain</td>
<td>• Quasi decentralized – hybrid; Read permission of the Blockchain restricted to participants&lt;br&gt;• Participants can agree to rule changes, reversals and modification&lt;br&gt;• Greater degree of privacy protections as only preselected entities are allowed to read the blockchain</td>
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<td>Private Blockchain</td>
<td>• Centralized – requires ‘high trust’ entity&lt;br&gt;• Only the centralized authority has the capability to agree to rule changes, transaction reversals and modification&lt;br&gt;• Transaction costs dictated by one entity</td>
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Blockchain

Peer-to-Peer Trading and Smart Contracts are major use cases of blockchain in power & utility

**BUSINESS VALUE DRIVERS**

- **Transparency**
  All Blockchain participants are able to view data added to the chain – while the chain improves data integrity by being the single source of truth – private data can be made visible only to participants as well.

- **Trust**
  Blockchain’s connected data blocks and distributed validation structure establishes trust between participants without them having to know one another.

- **Disintermediation**
  By enabling transparency and trust, the Blockchain can fulfill the roles that intermediaries traditionally provide.

- **Smart Contract Enabled**
  A smart contract is an executable program to trigger transfer of value and information under certain conditions - smart contracts can be developed, exchanged, and automatically executed on decentralized systems.

- **Auditability**
  Blockchain records are immutable, timestamped, and everlasting, creating an exhaustive means of record keeping.
Multiple blockchain technology use cases are gaining prominence across P&U sector

**Enabling Sharing Economy**

**P2P energy trading**

Blockchain can create secure and transparent trade of energy among prosumers and consumers within existing grids by creating cryptographically secured distributed peer-to-peer energy exchange platforms.

**Electric Vehicle charging and sharing**

When a driver charges the EV by connecting to a charging station, blockchain records the amount of energy consumed. When the charging completes, the amount of energy used to charge the EV is paid using a smart contract.

**Real Time Metering and Incentives**

**Real time metering and bill payment**

IoT enabled smart meters will accurately record and track the usage of the electricity securely through blockchain, and utilize smart contracts to control the flow based on the amount paid or prepaid by the consumers.

**Incentives and rewards**

For every specific amount of solar energy prosumers generate and transmit to the utilities company, they get awarded with cryptocurrency.

**Energy Trading and Settlement**

**B2B Energy wholesale trading and settlement**

Use of a blockchain platform to enable the execution of energy trades (e.g., power trading, renewable energy certificate trading, emissions trading).

**Records management**

Use a blockchain platform as an immutable record of customer identities, energy trading transactions, and ownership history of certificates.
Value Creation
Convergence of Disruptive Forces

Change is inevitable – four fundamental drivers will accelerate the digitization and transformation of the Power & Utilities industry

Rapid Technical and Economic Viability of Alternative Energy Technologies

- More distributed, electrified and affordable world comprised of connected communities
- Platform-driven business model built on grid, its digital overlay, and customer & community service foundation
- Network effects

New Performance Challenges and Expectations

- Slow Growth Increasing performance / cost expectations
- Societal Change – Changing customer / employee expectations
- Needs-based Replacement of Aging infrastructure and asset base
- Regulatory models evolving – shifting value
- Rise of millennials in the workforce
- Consumer expectations are set by digital native companies

Powerful New Digital Technologies

- Access to Cheaper Technology
- Improved Connectivity
- Powerful Cognitive Algorithms
- Cyber Risk Mgmt

New Techniques

- Future of Work
- Agile and Adaptive Business
- Human Centered Design
- Crowdsourcing
- Sharing and Subscription Economy
- Mega Platform Ecosystems
Digital Transformation is About ‘Becoming and Being’ Digital

Don’t get stuck here
Many organizations swirl in an endless loop of ‘doing’ digital things – an illusion of being digital – rather than making changes to business, operating and customer models.

Being Digital
These companies independently develop digital technologies and reap the benefits of rapidly scalable capabilities.

Becoming Digital
These companies are transforming their organizations to rapidly integrate digital capabilities across their business.

Doing Digital
These companies are following others in adopting digital technologies on an as-needed basis.

Exploring Digital
These companies are lagging in their adoption of digital technologies and risk significant erosion of their competitive positions.

Leverage Technologies to Create Value – Digital Transformation
Being Secure, Vigilant, and Resilient

How organizations protect themselves.

Who might attack?

What are they after, and what are the key business risks I need to mitigate?

What tactics might they use?

Cyber Risk Program and Governance

SECURE
Are controls in place to guard against known and emerging threats?

VIGILANT
Can we detect malicious or unauthorized activity, including the unknown?

RESILIENT
Can we act and recover quickly to minimize impact?
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Key Enablers – A Few Observations

**Business Value**
- O&M cost reduction
- Field experience and Efficiency
- Customer experience
- Capital Efficiency
- Incubating and launching new business models from a digital platform

**Digital Factory**
- In-house function devoted to digital solutions to achieve speed and scale
- Modeling new ways of building solutions and creating value (Design Thinking and Agile)
- Catalyst for the enterprise

**Portfolio & Governance**
- Internal and external idea generations
- Categorization and prioritization
- Business Engagement
- Portfolio level ROI
- Fail Early, Fail Fast, Learn Faster

**Digital Talent**
- Strategic Work and Workforce Planning
- Org and Job architecture redesign
- Tap into a broad pool of digital specialists and alternative talent models
- Digital Fluency

**Change Management**
- Experiential
- Compelling user stories
- Engaging the right advocates
- Support Minimal Viable Products (MVPs)
- Advanced tools