Big Data and the Healthcare Digital Enterprise

Blurring the Boundaries ... with Purpose
Tata Consultancy Services At-a-Glance

- **44** years in business
- **10+** billion US$ in revenues
- **~45** billion US$ in market cap
- **~240,000** employees representing, **103** nationalities
- **1076** clients in, **55** countries
- **98.3** % of revenues from repeat business

**Involved with**
Walk for Hope, United Way, March of Dimes and Marathons at NY, Chicago, Boston and Amsterdam

All figures as on 31st March 2012
TCS in Healthcare Overview

- **6%** of TCS FY’12 Revenues
- **7,000+** Consultants
- **1,000+** Doctors, pharmacists and clinical staff
- **25** Leading Edge Clients in all segments
- **12** Countries

**Global Consulting**

- Enterprise Solutions
- Application Development & Maintenance
- IT Infrastructure Services
- Assurance Services
- Business Process Outsourcing
- Engineering & Industrial Services

**Software Products and Industry Solutions**

**Our Healthcare Portfolio**

<table>
<thead>
<tr>
<th>Payers</th>
<th>Providers</th>
<th>Health IT Product Vendors</th>
<th>Pharmacy Benefit Managers</th>
<th>Healthcare Supply Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 of the Top US Payers</td>
<td>3 large Hospital Chains US/Canada</td>
<td>2 of the Top 5 US product vendors</td>
<td>3 of the Top US PBM</td>
<td>3 of the Top US HC Supply chain companies</td>
</tr>
<tr>
<td>Mutualities in Belgium</td>
<td>NHS, UK</td>
<td></td>
<td>3 of 5 US retail Rx</td>
<td></td>
</tr>
<tr>
<td>Mapfre HC Spain</td>
<td>Large Hospitals, India</td>
<td></td>
<td></td>
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<tr>
<td>State Govts in India</td>
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</tbody>
</table>
Business Intelligence Center of Excellence

>1 Billion USD of BIPM Revenue

67% Business from North America

27% Business from Europe

15,000+ BIPM Consultants servicing

300+ Customers in

16 Industry verticals on

50+ Technologies and platforms

TCS BIPM Revenues in Billion USD

Select Clients

A Decade of Change Ahead

- Blurring boundaries between Industries
- Ecosystem-led Innovation
- New models and growth agendas
- Business speed and reach
- Next generation effectiveness and efficiency
- Convergence of business and technology
Creating innovation opportunity at the intersections… or Problems

Mobile
- Product / Service Alternatives
- Period of Growth and Innovation
- New Market Entrants
- Technology Savvy Customers
- Broadband
- Lack of Specialization
- Economic Restructuring

Social
- Rapid Commodity
- Emerging Markets
- Real-time Access to Information
- Societal Shift in Behaviors
- Power Shift to Individuals
- Networked Markets are Smarter and Faster
- Eroding Barriers of Entry

Big Data
- High Customer Expectations
- Technology Savvy Employees
- Rising Energy Demand and Cost
- Price Transparency

Cloud

Mobile X Social X Big Data X Cloud
Isolated Initiatives

Mobile  Social  Cloud  Big Data

More silos

Outdated operating models

Shadow IT

Data overload

Governance confusion

Engagement challenged

Slow and inflexible

Ineffective policies

Digital Immigrants

Accelerating change

Skill gaps
The face of engagement

- Instrumentation
- Smart products
- Machine-to-machine
- Mobile applications

Stakeholder engagement

- Employee performance
- Transactional to experiential transition
- Gamification

Next Generation Efficiency

- Systems of record optimizer
- Personal Cloud
- Research oriented supercomputer
- Big data analytics engine

Growth and Effectiveness

- Inform operations
- Drive intelligent processes
- Optimizes outcomes

Inform interactions

Systems of engagement enabler
“Data sets so large and complex that it becomes difficult to process using on-hand database management tools”

- Infochimp
Big Data

Social
Sensors
Mobile
Traditional
Operational Maturity

Holistic Strategy
A framework for digital enterprise transformation

Program Development and Execution
An effective “strategic cascade” - taking strategy to executable and measurable programs and initiatives

Building Systems Of Engagement
Moving from transactional to experiential processes

Raising The Level Of Analytic Excellence
Moving from aspirational to transformed

Reconstructing and re-architecting Applications, Middleware and Security
Systems of engagement - shifting organization models – expanding service orientation - Hybrid Cloud – BYOT

Transforming Infrastructure
On-going virtualization, IaaS, PaaS
Acumen Maturity

Relationship Platform

Redefined

Organization and process

Insight

Analytics as a key source of insight

Experience

Experience enabler, owning the experience

Expansion

Expanding beyond “Media”

Presence

Basic brand

Enabler of digital enterprise characteristics
Transformation Road Map

Value Ecosystem
Products and Services
Go-to-Market
Culture and Organization

Holistic Digital Strategy

Social  Mobile  Big Data  Cloud

Four Quadrant Strategy
One Run > One Year of Claims

Cycling, Sport
12/01/12

- LAPS
- SUMMARY
- COMMENTS

12/01/2012 2:30 pm

SPORT
Cycling, Sport

- DURATION
  0:42:12
- DISTANCE
  14.84 mi
- AVG. SPEED
  21.1 mph
- AVG. PACE
  2.84 min/mi
- CALORIES
  570 kcal
- HYDRATION
  0.26 L

Endomondo

27:26
21.06 mph
108 ft

Sweat is just fat crying! You can do it!

Send peptalk
Human Face of Big Data

Me & Myself

I think _____ is most important for good health

- Proper diet
- Environment
- Genes
- Exercise
- Religion

Me & Myself

I usually get my information about the world from a _____

- 46% Computer
- 28% Tablet
- 13% TV
- 5% Other people

Trust

9 Questions
Let's get started on "Trust"

Start

3111249 questions answered
“THERE'S a battle raging on Massachusetts Avenue. I'm hopelessly outnumbered, trying to take control of a patch of land at the edge of the Massachusetts Institute of Technology. My fighter name is Spottiswoode. I try to seize control of the enemy portal, but get knocked back, losing health. They're too strong here.”

- Hal Hodson, NewScientist.com
"This is classic Google. They may get information about new monuments, and that actually helps them generate more interesting search results, because these are the things that local people say are interesting."

- Blair MacIntyre
  Director of the Augmented Environments Lab
  Georgia Tech, Atlanta
The Enabler is a Holistic Strategy

1. Innovation convergence
2. Characteristics-enabler
3. Efficiency to effectiveness
4. Initiative harmonization
5. Collaboration excellence
6. Ecosystem-in
7. Ecosystem clarity
8. Engagement enabler
9. Model redesign
10. Analytics excellence
“You tie your shoes, put on your headphones, take your first steps outside. You’ve barely covered 100 yards when you hear them. They must be close. You can hear every guttural breath, every rattling groan - they’re everywhere. Zombies. There’s only one thing you can do: Run!”

- from the “Zombies, Run!” game description
Transformed Customer Relationship

Go to Market
- Discover
- Research
- Trial
- Purchase
- Use
- Recommend

Products and Services
- Ideate
- Design
- Develop
- Test
- Package
- Bundle

Value Ecosystem
- Cloud Computing
- Social
- Big Data
- Mobile

Culture and Organization
- Crowdsource
- Join
- Alert
- Rate
- Advise

Source
- Sell/Resell
- Support
- Service
- Compete

TATA CONSULTANCY SERVICES
Experience certainty.

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Client is 61 y/o female. DX: early dementia / nervous system degeneration and, per her MD, progressing fast. Allergic to PCN. Client was unable to answer most questions; daughter answered for her as her self-directing other. Client can heat some meals; daughter brings some meals. Client attends Mental Health counseling 1x/week. Continent of bowel and incontinent of bladder, refuses to wear disposable briefs. Sleep is disturbed.

Client is 41 y/o female. DX: Non-spec pain in lumbosacral region. Follow-up visit for evaluation/refill of Rx regimen. Client was unable to answer questions regarding injury details she provided during her last visit. Client appeared nervous and responded in a heated tone when asked to provide prior details. Client attends Mental Health counseling once a week. Does not appear to be in compliance with PT regimen but refuses to discuss.
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<tr>
<th>DME Prior Authorization Form 1</th>
<th>DME Prior Authorization Form 2</th>
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<tbody>
<tr>
<td><strong>Patient:</strong> Ms. Dora Smith</td>
<td><strong>Patient:</strong> Mr. John Chen</td>
</tr>
<tr>
<td><strong>Diagnoses:</strong> MS, RA and Gout</td>
<td><strong>Diagnoses:</strong> Hemiplegia, HTN and Lack of Coordination</td>
</tr>
<tr>
<td><strong>CPT Codes:</strong> 97542, 97761</td>
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</tr>
<tr>
<td><strong>Place of Service:</strong> ABC Provider</td>
<td><strong>Place of Service:</strong> ABC Provider</td>
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<tr>
<td><strong>Date of Service:</strong> April 8, 2012</td>
<td><strong>Date of Service:</strong> May 15, 2012</td>
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**Clinical Justification for motorized wheelchair for Ms Dora Smith**

Patient is a 28 year old female with multiple diagnoses of multiple sclerosis, gout and rheumatoid arthritis. She requires Mod A with her ADLs. She lives alone and volunteers in the church near her home. Currently she is a manual wheelchair and due to declining U/E and L/E strength, is unable to maneuver manual wheelchair. She is at high risk for skin breakdown due to decreased muscle strength and loss of sensation. A motorized wheelchair with ROHO cushion will enable increased functional mobility, prevent skin breakdown and facilitate ADL independence.

**Clinical Justification for motorized wheelchair for Mr John Chen**

Patient is a 45 year old male with status post CVA with R sided Hemiplegia and history of HTN. He demonstrates lack of coordination and lives in Assisted Living. He needs Max A with ADLs. Patient is right dominant and currently uses manual hemi wheelchair within the facility, However, the functional mobility has significantly declined in the past 30 -60 days. He is at high risk for skin breakdown due to loss of sensation and decreased muscle strength. A motorized wheelchair with ROHO cushion will enable increased functional mobility, prevent skin breakdown and facilitate ADL independence.
Syama Sundar
Head of Healthcare Business Unit
Tata Consultancy Services
TCS Hy5 Canvas™
Unleash hybrid app development

- Single code base with standard web technologies to cater multiple platforms
- Powerful native wrappers to provide access to the device features
- Seamless integration with the back-end systems
- Powered by a set of middleware components

TCS Hy5 Test™
Rethink mobile application testing

- Automated testing of native, hybrid and web apps on iOS and android
- Reusability of test scripts across multiple devices and platforms
- No source code instrumentation of jailbroken devices
- Scalable solution for testing large number of applications and devices
OVERVIEW OF DIGITAL TRANSFORMATION SOLUTIONS

User Experience
- UX Research
- Heuristic Evaluation
- Creative Design
- Information Architecture
- Wireframe Development
- CSS and XHTML coding
- Usability Testing
- Accessibility Compliance
- Personalization

Web Content Platforms
- Integrated Digital Experience across Multiple Brand sites
- Self-service ability to Business users
- Consistent look-n-feel across touch points
- Seamless Multi-channel operations on Web-Mobile-Social
- Modern WCM technologies and solutions

Web Optimization
- Web Analytics & SEO Audit
- Click-stream Analysis
- A/B, & Multivariate Testing
- Behavioral Targeting
- Content Optimization
- SEO Optimization

Social Media
- Social Media Integration
- Social Widgets / Gadgets, Apps
- TCS Platforms: Listening, Crowdwise™, CubbuZZ™

Mobile & Omni-channel
- Mobile Website Design & Development
- Mobile Application Development
  - Responsive Web Design
  - Native Applications
  - Hybrid (hi5)

Collaborative Solutions
- Social Intranets
- Customer Service
- Marketing/Sales Enablement
- Product/Service Innovation

TATA CONSULTANCY SERVICES
Experience certainty.
Thank You
Interval Training

My programs

10 x 1 min tempo
Alternating 1 min high and 1 min moderate

6 x 0.5 mi
6 x 0.5 mi/3 min rest

Predefined programs

Standard
A standard interval session with 1 minute intervals. A good place to start

Pyramid
The high intensity intervals become longer then shorter - it's still tough after the “peak”

Tabata
High intensity interval training with short intervals gives good cardio exercise quickly

History

JUN 30
TOTAL DISTANCE: 8.05 miles

2.80 mi in 0:23:31
363 kcal
1 run 1 like 2 shares

JUN 27

5.25 mi in 1:20:18
417 kcal
4 runs

JUN 25
TOTAL CALORIES: 1479 kcal

7.19 mi in 0:44:27
782 kcal
2 runs 1 like 3 shares

2.13 mi in 0:38:46
218 kcal
1 like 4 shares

5.25 mi in 0:27:06
201 kcal

3.14 mi in 0:48:28

Sweat is just fat crying! You can do it!

Send peptalk
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Part 3. Digital Strategy | Transformation from company centric to customer centric channels

**Web**
- Product centric within silos
- Inconsistent Websites/Design
- Redundant Information

**Mobile**
- Large core application
- Many thin features
- Fails to leverage device features
- No tablet strategy

**Social**
- Communities in product silos
- Low participation due to lack of compelling experiences and Gamification

**Current State**

**Future State**
- Customer Centric Experience
- Consistent UX, IA, Nav, Apps
- Holistic Enterprise Platform

- More core apps, with fewer but richer device-specific features
- Tablet strategy for internal (e.g. sales) and consumer apps.

**TCS Capabilities – Digital**
Part 3. Digital Strategy

Transforming Call Center to Digital Engagement Center

- Policy definition
- Regulatory compliance
- Insight to action
- Crisis management

Fusing social to customer data
Insurance analytics taxonomy
Social analytics and insight
Predictive churn models

Insight to Action

Governance & Compliance
- Defined routing based on analytics
- Triggered workflow

Policy+ Prescriptive Action

Voice of the Customer
- Social listening
- Mobile monitoring
- Merged with traditional tracking

Advanced, Predictive Analytics

Digital Engagement Center

24x7, 360° Monitoring

Policy+ Prescriptive Action

24x7, 360° Response

Multi-channel, Multi-device
- Social/mobile engagement
- Dynamic social/mobile ads
- Cross channel customer mgmt-ex. Twitter to talk

Customer Experience

Enables a business to function at digital speed

TCS Capabilities – Digital