Supply Chain Transformation – A Case Study in the Innovative Use of Analytics

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Integrated Supply Chain (ISC)

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IBM’s Integrated Supply Chain (ISC) is a shared service organization serving all IBM brands and external clients
  - Pre-sales, supply/demand match, procurement, manufacturing, distribution, cash collection

Big Data & Analytics capabilities are powering the current evolution of SC
  - *Integrated* ⇒ *Smarter & Transparent Supply Chain*

ISC leverages and showcases innovative analytics developed across IBM for business benefits
  - Deep collaboration with IBM Watson Research, IBM Software Group (SWG), IBM business units, universities, government agencies, and our external clients
IBM Supply Chain Transformation & Role of Analytics

Select Supply Chain Analytics Solution Profiles

Collaborating for the Future
Everything we do within Integrated Supply Chain supports IBM overarching strategic priorities

Integrated Supply Chain & IBM Strategy Alignment

Shift from functional strategies to ONE seamless Integrated Supply Chain strategy
IBM supply chain delivers across the E2E enterprise

Sales
- Hardware
  - New Product Introduction
  - Material Sourcing
  - Manufacturing HW Fulfillment
- Software
  - New Product Introduction
  - Appliances
  - SWG Fulfillment
- Technical Services
  - Asset Management
  - Labor Management
  - Cost Management
- Business Services
  - Labor Management
  - Commercialization
  - Talent Management
- Process Services
  - Enable Solutions
  - Deliver Solutions
  - Grow Solutions
- Financing
  - Remanufacturing
  - End of Life Management
  - Scrap
  - Cost Management

Shared Services
- Sales Transactions (Pre-Sales to Cash Collection)
- Services & General Procurement
- Cost / Cash Management

Cross-brand Support
- Smarter Analytics
- Smarter Commerce Solutions
- Customer Solution Centers
- Client Experience Initiative
- Global Loaners and Trials Support
- Commercialization
- Business Continuity & Risk Management
- Enable Growth:
  - Solutions, Acquisitions, Growth Mkts
- Environmental & Social Responsibility

CLIENT
IBM Supply Chain Transformation.. a continuous process

- Silo'ed Structure
  - Divisional and Country Alignment
  - Each division - own Manufacturing
  - Each country - own Procurement & Cash Collection

- Horizontally Integrated
  - Horizontally integrated Process and Organization
    - Procurement
    - Manufacturing
    - Execution
  - Multi-enterprise collaboration

IBM Transformation required Fundamental Changes
from Multinational Era to Globally Integrated Enterprise
Analytics powers next phase of evolution in supply chain

Horizontally Integrated

Smarter Supply Chain

We Apply Advanced Analytics to

Continue the Journey
towards

Supply Chain 2020

- 9 plants, 5 consolidated Global Operations Centers
- $55B spend for HW, SW, Services, Solutions, external clients
- Cash collection >$100B
- 3.5M visits to customer fulfillment eTools
- 23K suppliers online

- Pervasive Visibility
- Predictive Intelligence & Optimization
- Total Risk Management
- Big Data Capability
Analytics organizational design & key stakeholders

Smarter Supply Chain Analytics (SSCA) Governance Model

- ISC analytics strategy development
- Advanced analytics project design, development, implementation
- WW VP Leadership
- IBM Research
- Advanced Analytics COC Network
- Advanced Analytics cross IBM Steering Committee
- Collaboration across IBM brands
- Solution commercialization, client sales and delivery support
Integrated Supply Chain (ISC) evolution to Smarter Supply Chain

We leverage learnings from our own journey for the benefit of our clients

- Point Solutions
- Decentralized
- Traditional Supply Chain applications

- Centralized organization and strategy
- Formal prioritization process
- Initiate service and labor projects
- Initiate training programs for users

- Extended supply chain.. Opportunity to Order, Client engagement, etc..
- Widespread use of labor analytics
- Solutions integrated into the fabric of execution processes
- Solutions integrated across multiple analytics applications and multiple processes
- Multi Enterprise / Cloud


Opportunistic Orchestrationd Interconnected Solutions
We rely on several types of supply chain analytics to leverage Big Data

Descriptive
Get in touch with reality, a single source of the truth, visibility

Predictive
Understand the most likely future scenario, and its business implications

Prescriptive
Collaborate for maximum business value, informed by advanced analytics

Cognitive
Highly automated optimization solutions that get smarter over time

What happened?
What will happen?
What should we do about it?

Big Data = All Data (structured, semi-structured, unstructured, internal, partner, macro environment)

Volume (data at rest)
Variety (many forms of data)
Velocity (data in motion)
Veracity (data in doubt)

Where is the next step-change in Optimization?
ISC portfolio of SC analytics; high value, multi-enterprise solutions
# Robust analytics portfolio drives cost & revenue impact across our business

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<td>Rich DSR, many sources of data, best forecasting engine, optimal channel inventory helping host and distribution partners</td>
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<td>Manages high volumes, high velocity data from upstream, results in supply assurance, higher cust sat</td>
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<td>Green Sigma™</td>
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<td>Cost savings opportunities by leveraging high volumes of data from sensing devices</td>
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<td>Transaction Center Optimization</td>
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<td>Labor optimization by leveraging many sources of data</td>
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**Bold solutions featured**

Full portfolio includes 30+ analytics solutions
We harness advanced analytics to generate sustained value for IBM and our clients

Critical Parts Management Toolset
- Multi-enterprise visibility
- Predictive analytics
- Supply assurance

Total Risk Assessment
- Broad scope risk assessment
- Social listening posts
- Risk anticipation

Transaction Center Optimization
- Labor optimization
- Leverage many sources of data

Transparent Supply Chain
- Radical visibility
- Synchronized analytics
- Mobile capability
Critical Parts Management Tool provides upstream multi-tier visibility with analytics & optimization

The Solution
Advanced analytical tool provides **visibility, management & optimization of critical parts** across all upstream tiers of supply chain

Key Benefits
- Comprehensive network visibility, 75K+ SKUs, 100+ suppliers
- Resource savings of 50%+ of costs of managing shortages (expedites, personnel, etc)
- Higher levels of Customer Satisfaction, on order of 20%+
- Allowed significant agility in handling supply constraints in Asia during 2011 and 2013

Industry awards in 2012
- Institute Supply Mgt: Excellence in Supply Mgt
- ML100 Manufacturing Leadership award

Days to close an issue
- Critical parts issues

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Aggregated view across multiple contract manufacturers.

TAB for each using contract manufacturer (CM)
Highly evolved approach to predictive risk management

The Solution

Provides comprehensive risk assessment and ongoing mitigation, protecting against loss of revenue and profits by minimizing the likelihood and severity of supply chain disruption.

Key Benefits

- Uncovers multiple risks, assesses likelihood and impact of each
- Addresses risks with formal mitigation plans
- Provides consistent risk management approach across brands/commodities
- Trends and patterns are revealed by systematic risk analysis, allowing for risk prediction

Industry Recognition

- CSCMP finalist for Supply Chain Innovation award
- IBM Outstanding Innovation Award

Supplier Total Risk Tool & Process

- Risk Assessment
  - Catalogue full supplier risk exposure across multiple risk categories
  - Perform probability-based risk assessment
  - Implement automated tool
- Risk Mitigation Planning
  - Develop risk mitigation strategies with process for executive approval
  - Establish control limits for each risk element
  - Drive new business processes, escalation pathways
- On-going Risk Monitoring and Control
  - Monitor risks against specified threshold limits
  - Update proactive risk mitigation strategies as risk exposure evolves
  - Work within sourcing community to handle crisis situations
Our Transparent Supply Chain approach will provide 360 degree visibility to many KPIs, and an analytical platform to manage them.

The Solution

- The solution consolidates events across the end-to-end value chain, and applies advanced analytics for optimized cost, service levels and client experience.
- Provide visibility across existing applications and data sources to create a predictive and smarter supply chain.

Key Benefits

- Consolidated information framework – one version of the truth, actionable alerts, drill-down capability.
- Initiates recovery either automatically (self-healing, resilient SC) or through decision feedback loops.
- Advanced analytics and optimization – synchronized and ubiquitous.
- Predict and act to optimize client experience.
- Collaborate continuously in real-time across IBM and with partners.

Key early functionality:
- Visualization, multi-enterprise, cross functional.
- Order tracking, progression.
- Supply prediction.
- Point analytics synchronization.
IBM vision is to provide visibility across existing applications & data sources for a predictive & smarter supply chain.
Transaction Center Optimization uses advanced analytics to manage the sales support workforce from opportunity identification thru cash collection

The Solution

Uses advanced analytics to balance workload and workforce, taking into consideration different skill sets and job requirements. Enables improved workforce planning, data-driven decision making, and insight into performance of dynamic delivery environment.

Key Benefits

- Improves operational efficiency by aligning staff availability with predicted workload
- Optimizes workload by pooling capacity across teams and identifying cross skill opportunities
- Reduces overtime and variable labor contracting while improving delivery performance and services provided to sales force and business partners
- Integrated visibility from Order Identification through Order Management and Cash Collection

“leveraging advanced analytics, to better plan personnel resources ... what skills do you need and when and where do you need them”

Key Features

- Executive Dashboard
- Transaction Forecasting
- Capacity Analysis
- Request Assignment and Prioritization
Visibility to current labor workload and predicted future workload

By displaying the future volumes over time as well as compared to the previous six weeks actual provides management a recent point in time comparison
Lessons learned – how to establish momentum & success with analytics

- Start with a **business pain point**
- Have a **visualization** and **user interface strategy**
- As critical as the math and **analytics expertise** are, **transformation leadership** and **execution/operations expertise** is even more important *(3-in-the-box management system)*

- **Iterative approach**
  - It is OK to **start small and build towards major impact**
  - **Iterative approach** allows you to improve your capabilities along the way and build progressively stronger stakeholder support
  - Incorporate **cycles of learning** into the analytics solution

- **Incentive alignment**
  - Design **Compelling business benefits** for each supply chain participant *(win/win/win)*
  - Reflect benefits in **terms and conditions**
  - Encourage utilization with **PBCs**
ISC collaborates extensively inside & outside of IBM as we create value through Smarter Supply Chain

ISC SC advanced analytics portfolio (30 solutions)

IBM BUs, Brands

Global Business Services (GBS)

Software Group

IBM Research

Systems & Technology Group (STG)

Global Process Services (GPS)

Examples

✓ Supply Assurance Offering
✓ Quality Transformation
✓ S&OP

✓ Smart Appliances
✓ Cloud deployment

✓ Smarter supply chain services
✓ Procurement BPO

Benefits accrue to IBM and our clients
QEWS identifies trends before traditional Statistical Process Control

The Solution

Software system using proprietary IBM technology to detect & prioritize quality problems earlier with fewer false alarms, coupled with push alert functionality for IBM & suppliers to proactively detect & manage quality issues at any stage of product lifecycle.

Key Benefits

- **Cost savings** – $50M (2015 IBM Financial Roadmap period), approximately $10M per year hard warranty savings, additional soft savings and benefits in other areas.

- **Proactive quality mgt** – identify & resolve issues before they become problems, weeks or even months earlier than traditional SPC. Improved quality mgt processes overall.

- **Improved brand value** – preserves customer satisfaction through maintenance of high quality standards, protects high-stakes product launches, protects brand image.

Industry Recognition

- IBM recognized by the Publication ‘Information Week’ as a leading innovator for 2012 in the Electronics Industry on the basis of the QEWS solution.
Leading global auto manufacturer hires IBM to analyze potential of improved real-time predictive maintenance capability

Client Business Challenge
- Client pursuing quality excellence for 70 years, but needed a breakthrough
- Wanted to better utilize extensive warranty information
- Part of a Corp strategy to leverage analytics & ‘Big Data’

Solution and Benefits
- Real-time predictive maintenance capability in end state (currently developing and rolling out Pilot)
- Data will stream from vehicle to Predictive Asset Optimization solution where advanced detection (QEWS) & Predictive Maintenance & Quality (PMQ) will be
- Client will better predict, analyze & manage warranty issues
- In data demo, QEWS identified warranty issue significantly earlier than the client’s existing system

Solution scope for client

Early Detection
- Anomaly Detection
- Investigate Issue
- Specify Problem

Early Resolution
- Plan Resolution
- Apply Resolution

① Detect warranty trends
② Root cause and pattern analysis
③ Drill-down, identify issue
④ Decision mgmt, action plan
⑤ Make corrective changes,

Quality Early Warning System (QEWS)
Predictive Maintenance & Quality (PMQ)

Multiple modules exist within PMQ, eg SPSS, Cognos, other
ISC supply network: 2020 vision
Questions and answers... and thank you

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