Transforming R&D into a Customer-Focused Organization

Volker L. Reichert & Reid G. Smith
Key Elements of Schlumberger R&D Methodology

Standard Product Development Process

• ClientLink Initiative
  – Activity focus
  Identification of client needs, leading to joint projects with clients

• Technology Watch
  – New product technologies and processes + R&D leverage
    
    **Surveillance:** universities, government laboratories, suppliers, customers, and other industries
    
    **Communication:** Actively across the organization

• Vision & Roadmaps
  – Informed long-term view

• Portfolio Analysis
  – Optimization of R&D impact

• Concurrent Engineering
  – Product development cycle time and cost + Ability to develop complete solutions
    
    *Multi-functional product teams*
    
    Marketing, Customers, Research, Suppliers, Engineering, Manufacturing, … Cross Product Line

Information Technology

People
ClientLink Solutions Program

Database
WWW Access

Type 1 Need
Best Practice Solution

Type 2 Need
Joint Local Solution Possible

Type 3 Need
No Solution Needs R&D

Service Personnel

Field Support
Marketing
R & D
Concurrent Engineering and the Product Development Cycle

Original development cycle for product family

Multi-functional product development teams reduce cycle time and cost

Common design platform reduces workload for successive product developments

Cycle time reduced by overlapping successive developments within a product family
Integrating Design and Manufacturing Systems

Traditional Engineering

Concurrent Engineering

Houston

Paris

Tokyo


SHERPA

Process Reengineering

MFGPro


Changing the Work Game

Permanently rethinking work, re-inventing business & jobs through a distributed matrix organization evolving from a world class basis of metiers

The global economy is changing
The work force is changing
Jobs are changing
Are we ready

?
"Take more risks and make change an integral part of our strategy"

Challenges

Simplifying our business process
Opening up to the outside
Every employee with market culture
Staffing for World Class competence with constrained resources
Clear accounting of site’s contribution to the company
Although individuals are managed, compensated and promoted vertically through their Functional Organizations, they work horizontally on product and project teams.
Metiers & Product Development Teams

Metiers

Product Development Teams
When formed, Product Development Teams operate independently of the Metiers, except for the requirement that they transfer knowledge and learning.
Resources Grouped by Metier

Metiers

Leader | Internal with partner | External with partner

Product Development Teams
Resources distributed into PDTs

Product Development Teams

Leader | Internal with partner | External with partner
Metier Skills

Metiers

Product Development Teams

Technological + Functional

Leader

Internal with partner

External with partner
The Different Roles

Metier
- Cost Center
- Demonstration of "World Class"
- Development of People
- "The Coaches and the Warriors"
  sell their expertise and add value

Product Development Team
- Profit Center
- Get products out the door into customers’ hands
- Market Relevance
- "The Heroes" ...
Contribution and Reward

Metier
- Contribution: Expertise
- Reward: Personal Development

Product Development Team
- Contribution: Commitment to success of product & team
- Reward: Bonus + Recognition

... for the same individual
A New Deal to Change the Game
The 4 New Processes

- **New Technology**
  - Innovation
  - Speed

- **Revenue**
  - Breakthrough
  - Heavy-Duty
  - Lightweight
  - Mature
  - Declension

- **Drivers**
  - Capitalization
  - Economy
Modulated Product Development Guidelines

Breakthrough

Marketing
Feasibility

Design

Integration

Industrialization

Heavy-Duty

Marketing
Feasibility

Design

Integration

Industrialization

Lightweight

Marketing
Feasibility

Design

Integration

Industrialization

Mature

Marketing
Feasibility

Design

Integration

Industrialization

Schlumberger
The Product Development Team controls its strategy within a strong code of modulated standards.
Transition Paths Along Life Cycle
Projet d'Entreprise
Schlumberger Riboud Product Center

"Take more risks and make change an integral part of our strategy"

Challenges

Simplifying our business process
Opening up to the outside

Every employee with market culture

- PCS sessions for all projects. Encourage customer participation
- Every lightweight team with a customer sponsor
- Formal Customer Advisory Board
- Temporary ad hoc assignments of customers to SLB & vice versa to encourage “empathic design” concept

Staffing for World Class competence with constrained resources

Clear accounting of site’s contribution to the company
Transforming R&D into a Customer-Focused Organization

Standard Product Development Process

- Adaptations to improve focus and profitability
  - Breakthrough, Lightweight, Heavy-Duty, Mature
- ClientLink Initiative
  - Empathic design
- Technology Watch
  - Still much to do
- Vision & Roadmaps
- Portfolio Analysis
  - Ensure R&D is an investment, not a cost
- Concurrent Engineering
  - Cover the entire R&D organization: research, engineering, manufacturing, …

Information Technology

People

- Team-based empowerment
- Metiers for world-class competence
- Career building to continuously re-invent employees
Transforming R&D into a Customer-Focused Organization

Standard Product Development Process
  ➔ Adaptations to improve focus and profitability
    Breakthrough, Lightweight, Heavy-Duty, Mature
  • ClientLink Initiative
    ➔ Empathic design
  • Technology Watch
    – Still much to do
  • Vision & Roadmaps
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Information Technology
People
  ➔ Team-based empowerment
  ➔ Metiers for world-class competence
  ➔ Career building to continuously re-invent employees

What’s Next?
  • Virtual R&D, Sunshine Engineering
# Reaching World Class within 3 years

<table>
<thead>
<tr>
<th>Function</th>
<th>Definition</th>
<th>Three year milestones to World Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel</td>
<td>Human resources development</td>
<td>Implementation of personal project</td>
</tr>
<tr>
<td>Finance</td>
<td>Accounting &amp; Business Control</td>
<td>• Activity Based Accounting</td>
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<tr>
<td></td>
<td></td>
<td>• Transfer Cost Accounting</td>
</tr>
<tr>
<td>Information Technology</td>
<td>Set-up of networked computer resources &amp; applications</td>
<td>• Stimulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Transforming IT into strategic tool</td>
</tr>
<tr>
<td>Marketing</td>
<td>Validation of product development</td>
<td>• Product Watch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3rd &amp; 4th generation R&amp;D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Methodology to validate projects</td>
</tr>
<tr>
<td>Process &amp; Service Quality</td>
<td>• Process improvement</td>
<td>Adaptive process guidelines</td>
</tr>
<tr>
<td></td>
<td>• Quality Assurance for products &amp; service</td>
<td></td>
</tr>
<tr>
<td>HSE &amp; GS</td>
<td>• HSE permeating site life and integrated in tools from design to process</td>
<td>• HSE integrated into Development Guidelines</td>
</tr>
<tr>
<td></td>
<td>• Borderless safety</td>
<td>• Tangible business opportunities for HSE</td>
</tr>
<tr>
<td>Logistics</td>
<td>Manage materials logistics flow</td>
<td>• Worldwide procurement strategy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• State of the art distribution network</td>
</tr>
<tr>
<td>Legal &amp; Patents</td>
<td>• Protection of SLB technology</td>
<td>Pro-active patent &amp; contract</td>
</tr>
<tr>
<td></td>
<td>• Patent watch / contracts</td>
<td>process shared within SLB</td>
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### Reaching World Class within 3 years

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<tr>
<td>Sensor Physics</td>
<td>Understanding measurement physics and its implementation in products</td>
<td>• Risk assessment • Research integration</td>
</tr>
<tr>
<td>Electrical</td>
<td>Design and packaging of high resolution &amp; high temperature electronics</td>
<td>Make available new low cost processes</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Design &amp; qualification of sensors sub-assemblies for hostile environment</td>
<td>Mastering &amp; implementing new low-cost mechanical processes</td>
</tr>
<tr>
<td>Acquisition / Interpretation</td>
<td>Real-time acquisition &amp; data evaluation</td>
<td>Global inversion in 4 dimensions</td>
</tr>
<tr>
<td>Integration</td>
<td>Organization of internal &amp; external resources for product integration</td>
<td>Global subcontracting strategy</td>
</tr>
</tbody>
</table>

**Leader**:
- Internal with partner

**External**:
- Leader

**Internal with partner**:
- Leader
# Challenge 1: Simplifying our business process

<table>
<thead>
<tr>
<th>Quantum Performance Improvement</th>
<th>1997</th>
<th>Expectations</th>
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</thead>
<tbody>
<tr>
<td>Breakthrough team</td>
<td>• New product for benchmarking</td>
<td>• 30% of resources</td>
</tr>
<tr>
<td>Innovation</td>
<td>• 30% of resources</td>
<td>• 50 to 100 M$ new product revenues</td>
</tr>
<tr>
<td></td>
<td>• average 2 / year</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• proven ROI</td>
<td></td>
</tr>
<tr>
<td>Heavy-Duty team</td>
<td>• New platform development</td>
<td>• Tool types reduction</td>
</tr>
<tr>
<td>Capitalization</td>
<td>• Tool types reduction</td>
<td>• Reduce Field Capex by 20%</td>
</tr>
<tr>
<td></td>
<td>• Maintenance cost reduction</td>
<td>• % of M&amp;S / job divided by 2</td>
</tr>
<tr>
<td>Lightweight team</td>
<td>• Platform declension</td>
<td>• Customization: 30% of output</td>
</tr>
<tr>
<td>Speed</td>
<td>• Platform declension</td>
<td>• Specific products generate 25% new customers</td>
</tr>
<tr>
<td>Mature Product</td>
<td>• Batch production</td>
<td>• Cycle reduced to 4 months</td>
</tr>
<tr>
<td>Economy</td>
<td>• Batch production</td>
<td>• Productivity gain: 20% (12M$)</td>
</tr>
<tr>
<td></td>
<td>• Cycle reduced to 4 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Team contribution acknowledged by the Field</td>
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Challenge 1: Simplifying our business process

Expectations

- Culture of effectiveness driving simplified business processes
- Adapting to change by mobilizing the appropriate distributed matrix organization of proper development teams
- Four types of transversal product teams with resources mobilized from World Class metiers
- Teams focusing on a single mission with full control of strategy within a strong code of modulated standards
- Quantum performance improvements
The New World of Work

• Mobility
• Labor Efficiency
  ⇒ Better technology
  ⇒ Better process
  ⇒ Better educated workers
• Information Power
  ⇒ Decisions can be made faster, by those closest to the customer
• Empowerment
  ⇒ Team-based systems give employees more satisfaction
• Career Building
  ⇒ Employees, like business, must be continuously re-invented
• Teamwork
  ⇒ Taking new steps toward breaking up hierarchical business cultures
Making Knowledge Productive

Expectations

• Business process simplification
  • Clear and specific targets / responsibilities
  • Focused, modulated action teams
  • Full freedom within standards
  • Transversal (faster, shorter communication)
  • Faster decision making

• Dynamic personnel development
  • Development oriented organization
  • Better placement of people & room for mobility
  • Graduated management opportunities and training
  • Programmed competence enhancement
    (World Class metiers)

• Customer-oriented business
  ⇒ Market-driven products
  ⇒ Fast response to market changes
  ⇒ Flexible answers to market demand

• Optimization
  ⇒ Competence & manpower adapted to tasks
  ⇒ Better usage and integration of technology
  ⇒ Time to market
  ⇒ Low cost innovation

Prerequisites

• Culture of effectiveness (Contributing knowledge workers)
• Dynamic equilibrium between PDT and Metiers
• Balancing expectations and realities
• Problem solving rather than win-lose behavior
Expectations for July 1996

EXTERNAL

• Present our approach to outsiders (i.e., MIT, MCE)
• Formalize the interfaces between internal R&D groups
• Prepare the first benchmarks

INTERNAL

• Validate the 4 processes
• All projects to follow the defined processes
• Train all managers on "effectiveness"
• Address any urgent people issues
• Validate required competence matrix & define needs for next three years
• Launch a partnership on new mechanical solutions
Les règles du jeu

Les acteurs

• VR :
  – Clarifier la vision
  – Animer l'équipe de Direction
  – "Orienter la pilote"

• L'équipe de direction :
  – Assurer la cohérence vision-ambition-opérationnel
  – Mettre en charge les responsables de cible

• Les leaders d'ambition
  – Rechercher toutes les informations internes et externes qui permettent de donner un sens et une pertinence à l'ambition vis à vis de l'environnement

• Les responsables de cibles :
  – Organiser les moyens et le pilotage pour assurer que la cible est atteinte et que "des marches se franchissent"

• Le "pouvoir" des leaders et des responsables de cible
  – Leur droit : intervenir dans toute l'entreprise pour faire avancer leur cible ou leur ambition
  – Leur devoir : convaincre et intéresser les personnes qu'ils sollicitent et ne pas user de pouvoir hiérarchique
Les règles du jeu

Le rythme - équipe de Direction

• Mensuel
  – Suivi du Challenge et de la communication

• Trimestriel
  – Réajustement des ambitions

• Semestriel
  – Validation de la cohérence vision-ambitions-opérationnel et environnement
Blueprint for the Future

In an unpredictable and rapidly changing world our future will be determined by our ability to transform knowledge and creativity into new business opportunities.

Euan Baird - April 1994

What really matters is that every employee understands the whole basic master plan of the company and can use it, knowing his role in the organization, to make the right decisions in his own environment.

The employee becomes a knowledge worker whose work is defined by results rather than quantity. What is important is not only to do things right but to do the right things.