Transforming R&D into a Customer-Focused Organization

Volker L. Reichert & Reid G. Smith

Schlumberger Introductory Slide

Key Elements of Schlumberger R&D Methodology

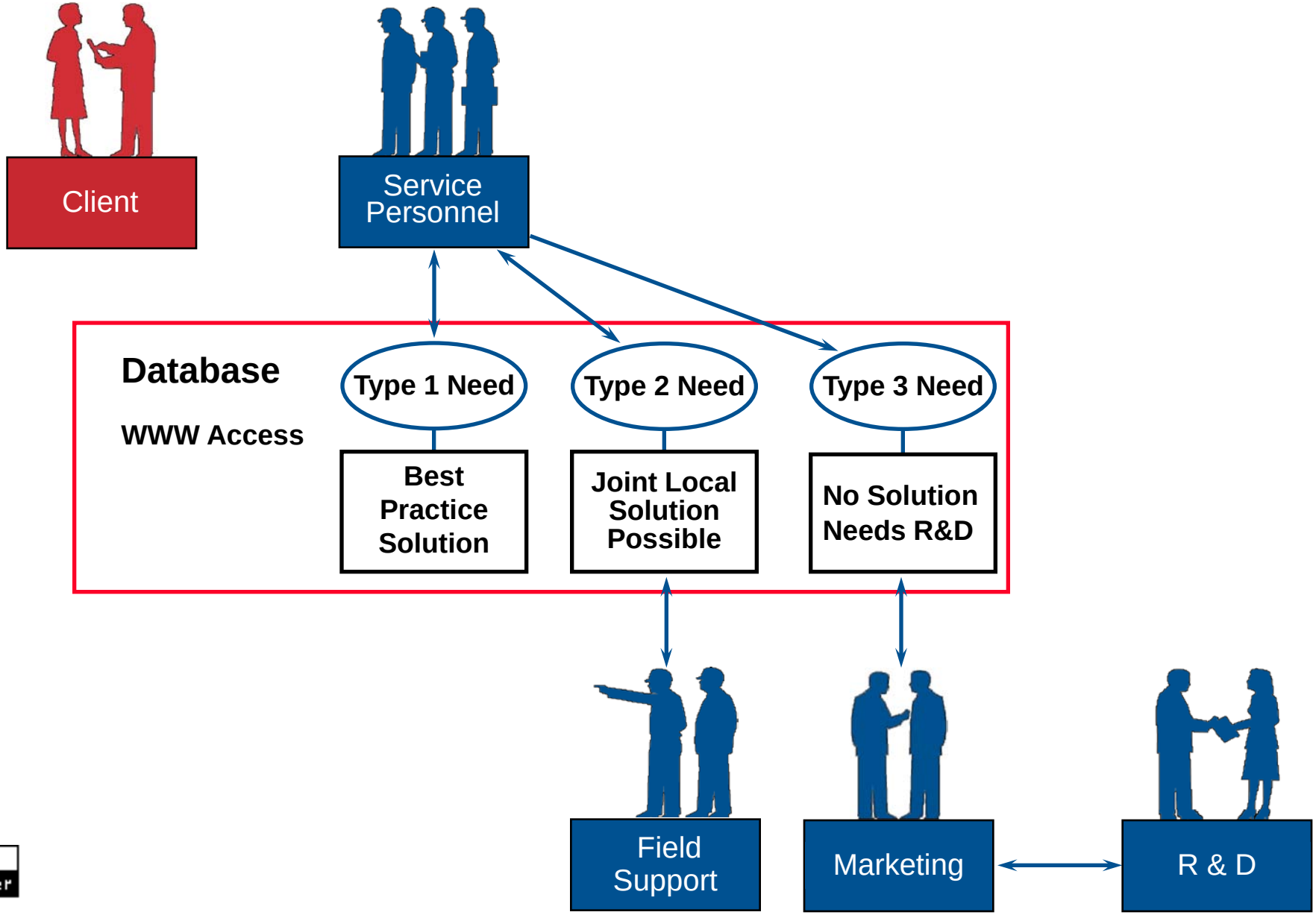
Standard Product Development Process

- **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

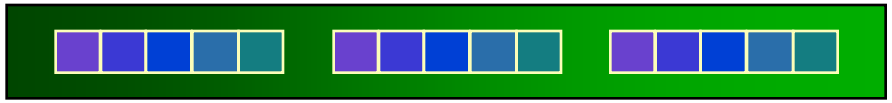
People

ClientLink Solutions Program



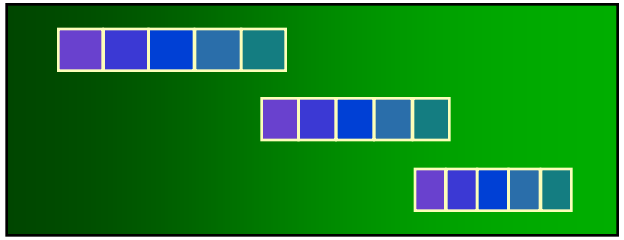
Concurrent Engineering and the Product Development Cycle

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

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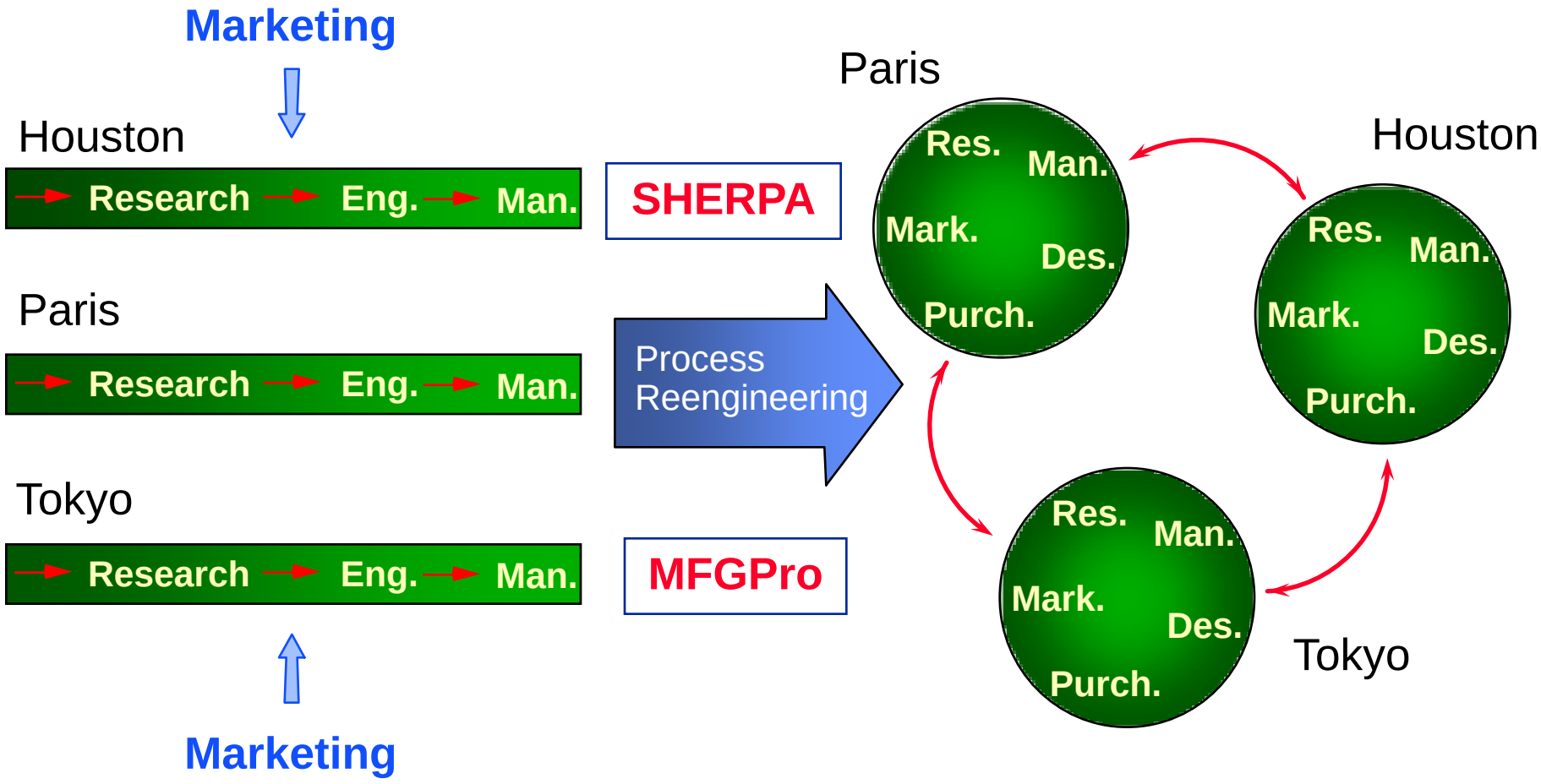
Integrating Design and Manufacturing Systems



Changing the Work Game

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

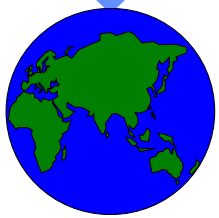
The global economy is changing

The work force is changing

Jobs are changing

Are we ready

?



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Projet d'Entreprise
Schlumberger Riboud Product Center

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

Challenges

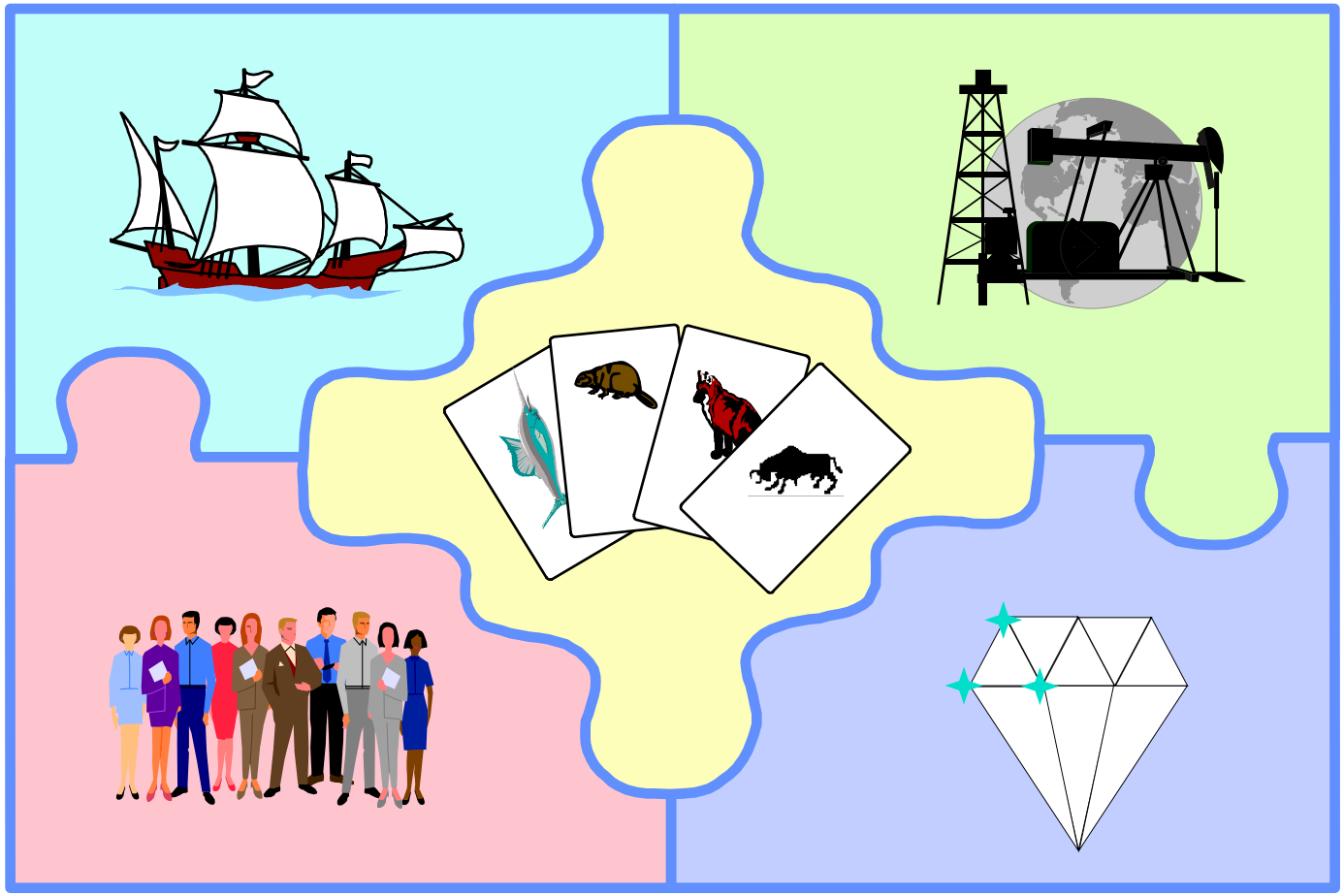
Simplifying our business process

Opening up to the outside

Every employee with market culture

Staffing for World Class competence with constrained resources

Clear accounting of site's contribution to the company



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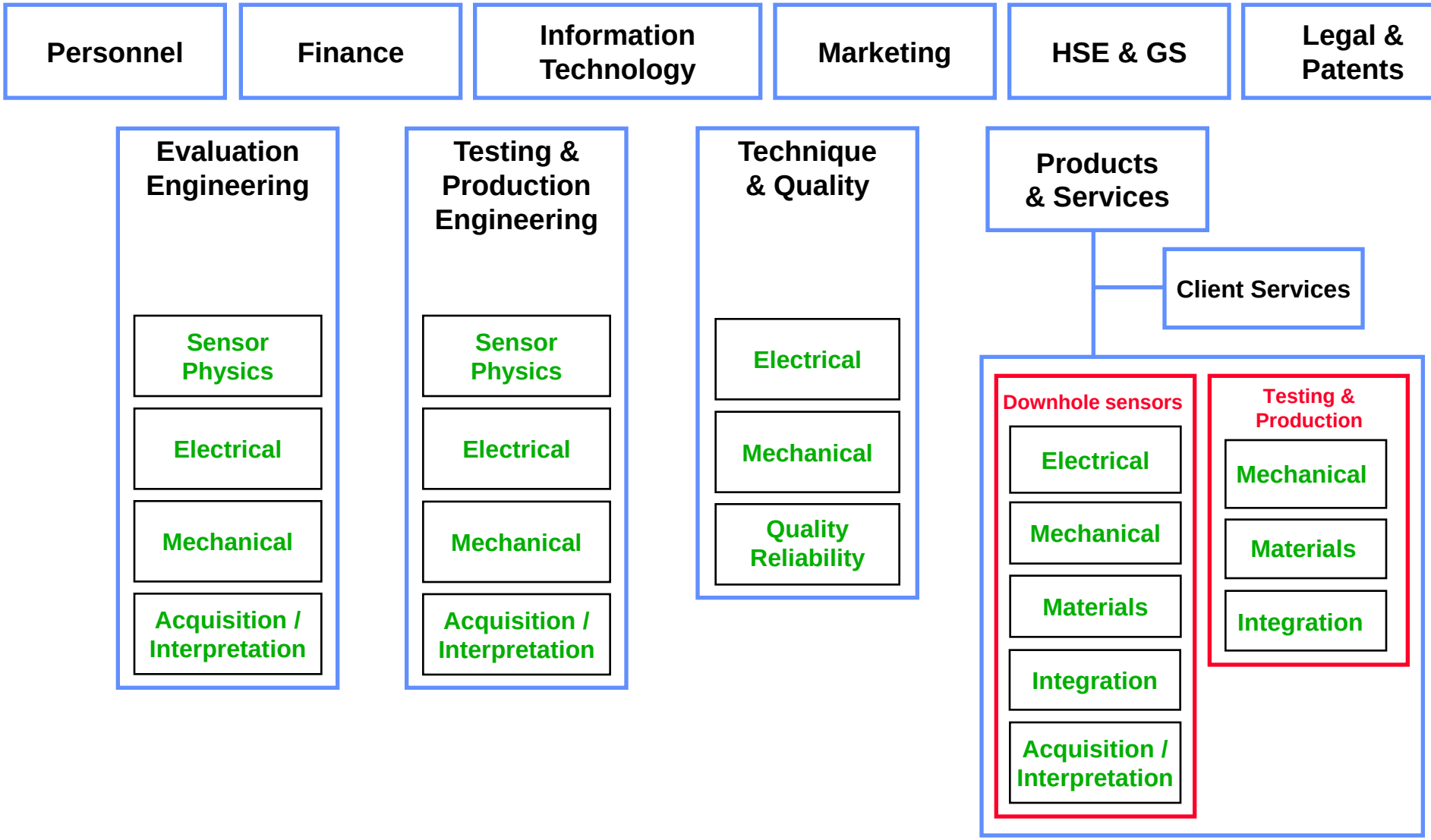
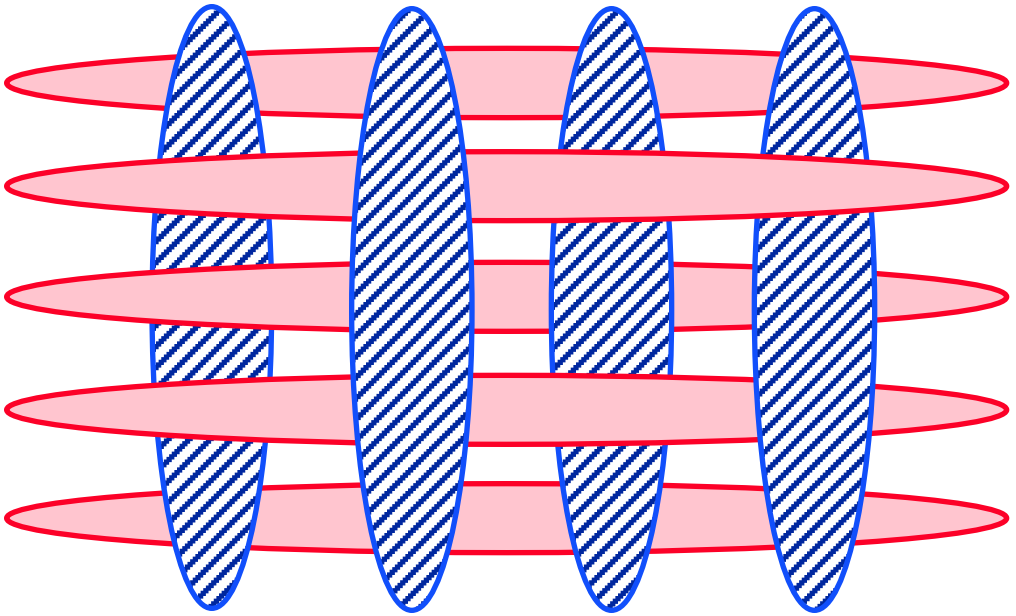
Previous Organization



Classical Matrix Organization

Functions

Projects or Products

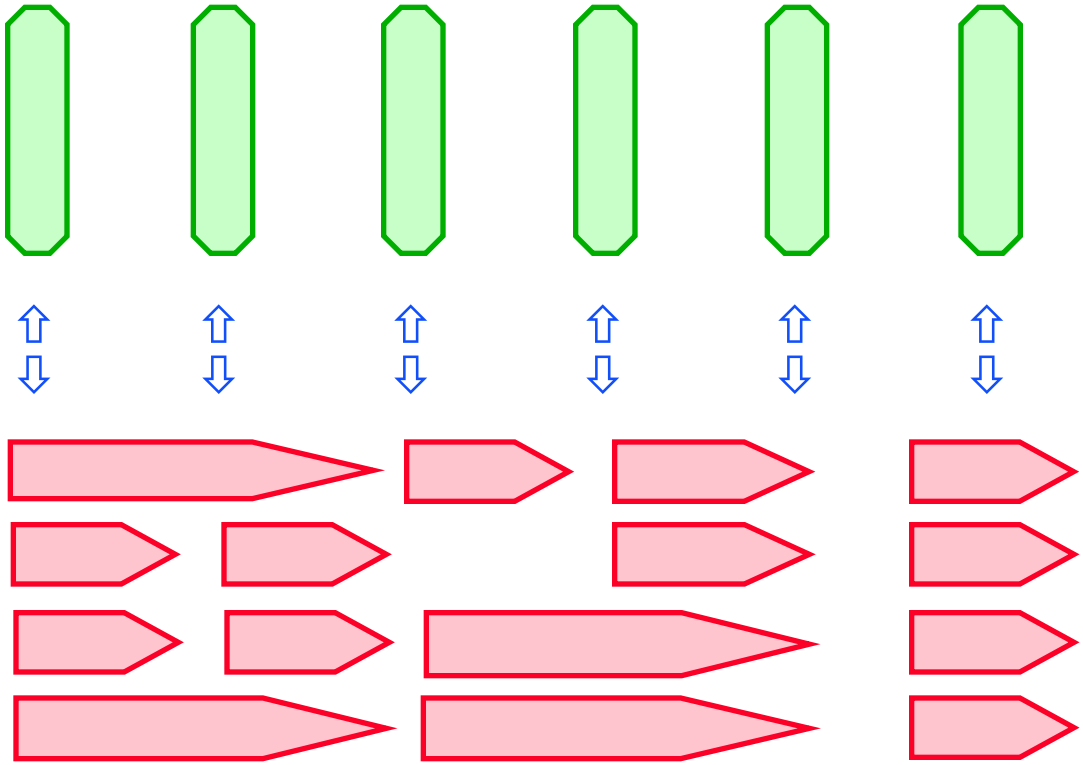


Although individuals are managed, compensated and promoted vertically through their Functional Organizations, they work horizontally on product and project teams.

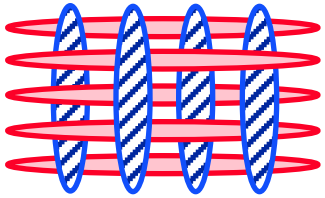
Metiers & Product Development Teams

Metiers

Product Development Teams



Distributed Matrix Organization



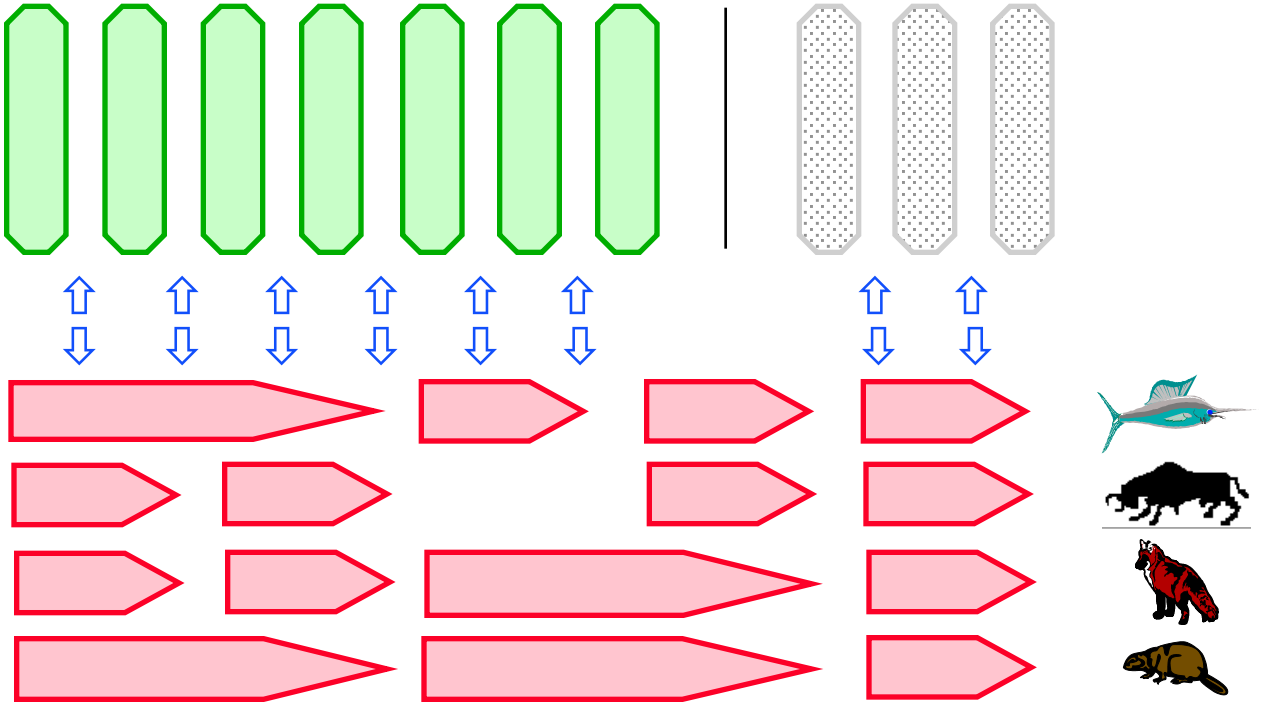
Metiers

Functional or Scientific Centers of Excellence

Leader | Internal with Partner | External with Partner

Knowledge transfer

Product Development Teams



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

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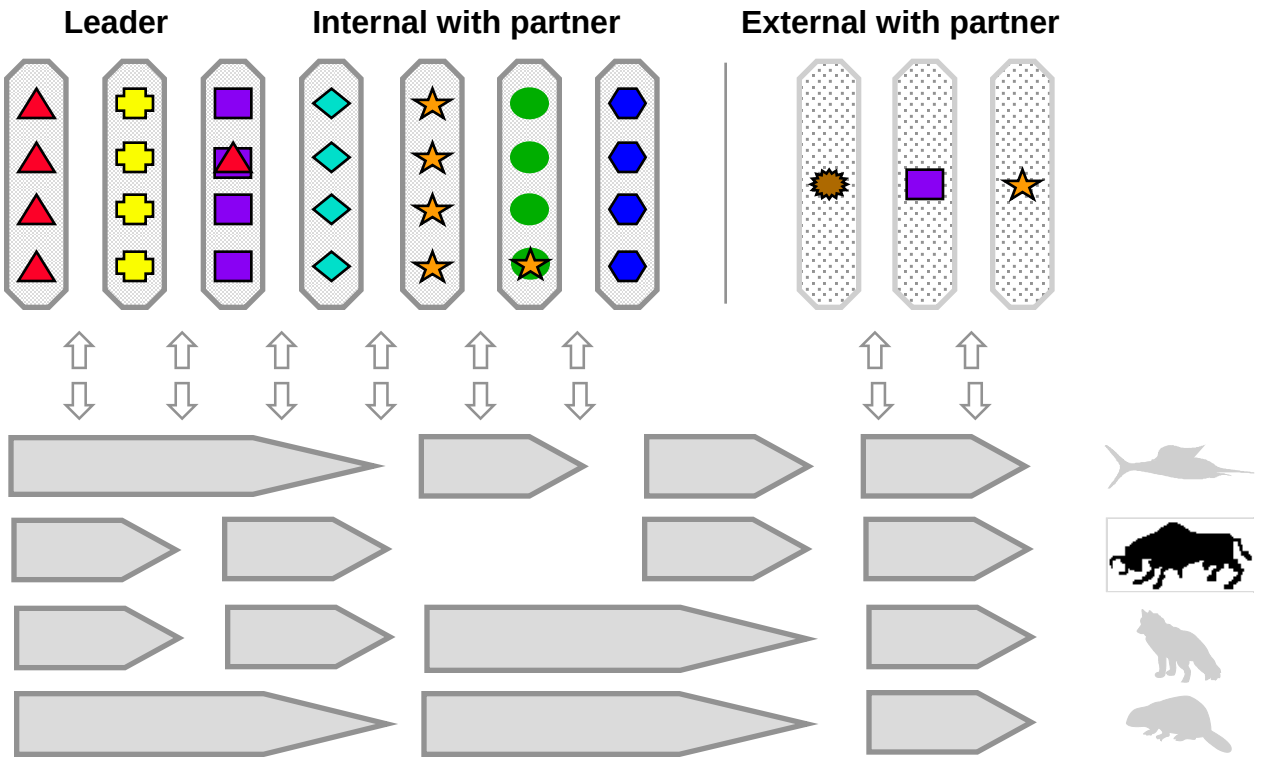
Resources Grouped by Metier

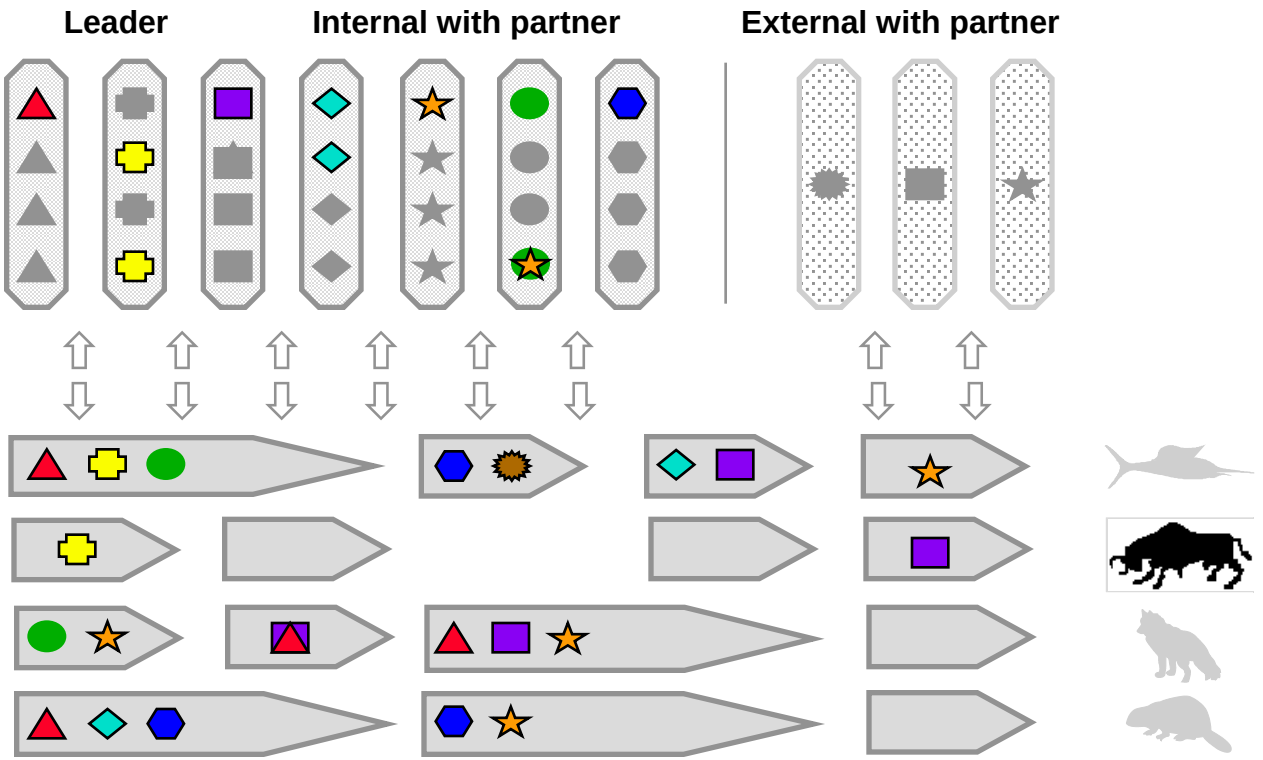
Metiers



Product Development Teams

Resources distributed into PDTs

Metiers

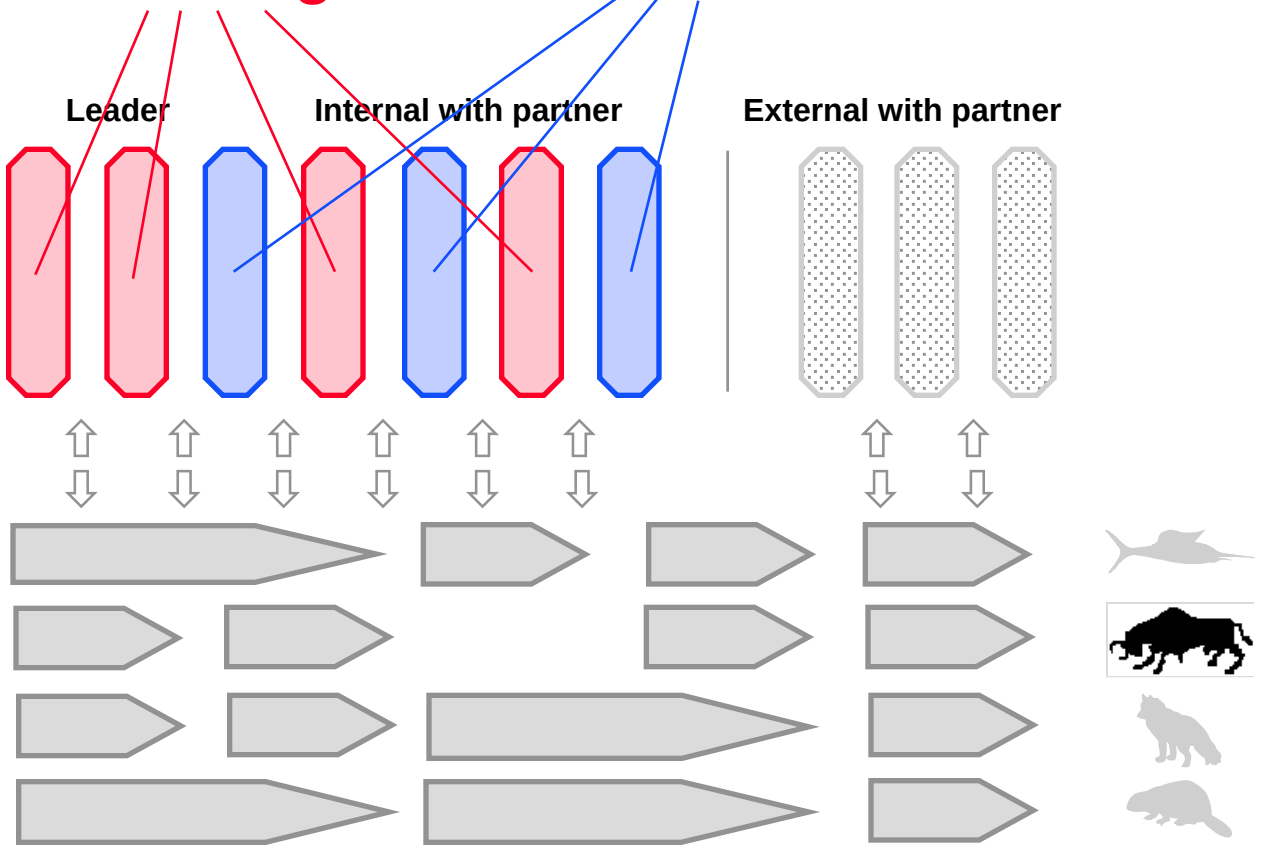


Product Development Teams

Metier Skills

Metiers

Technological + Functional



Product Development Teams

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

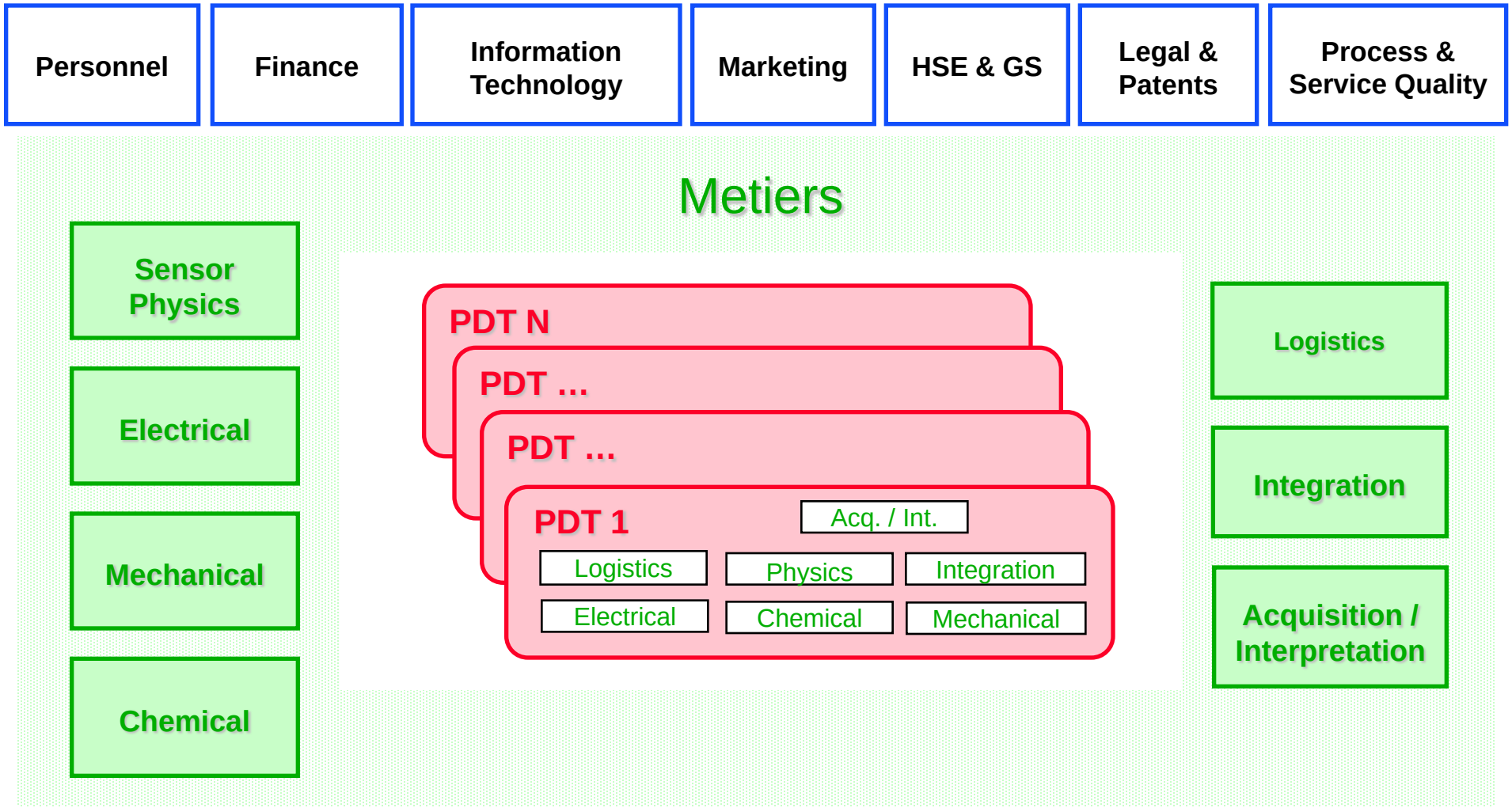
- **Contribution: Expertise**
- **Reward: Personal Development**

Product Development Team

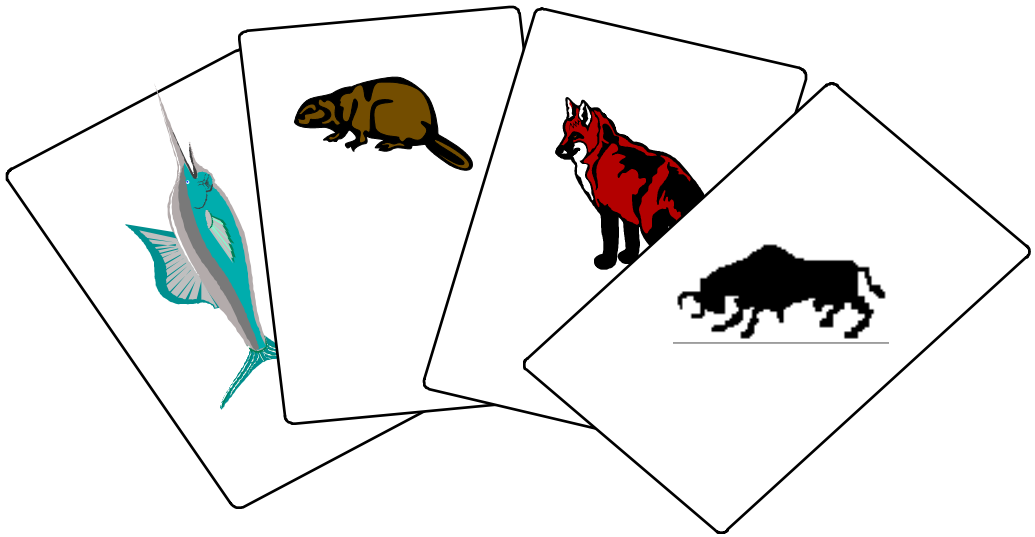
- **Contribution: Commitment to success of product & team**
- **Reward: Bonus + Recognition**

… for the same individual

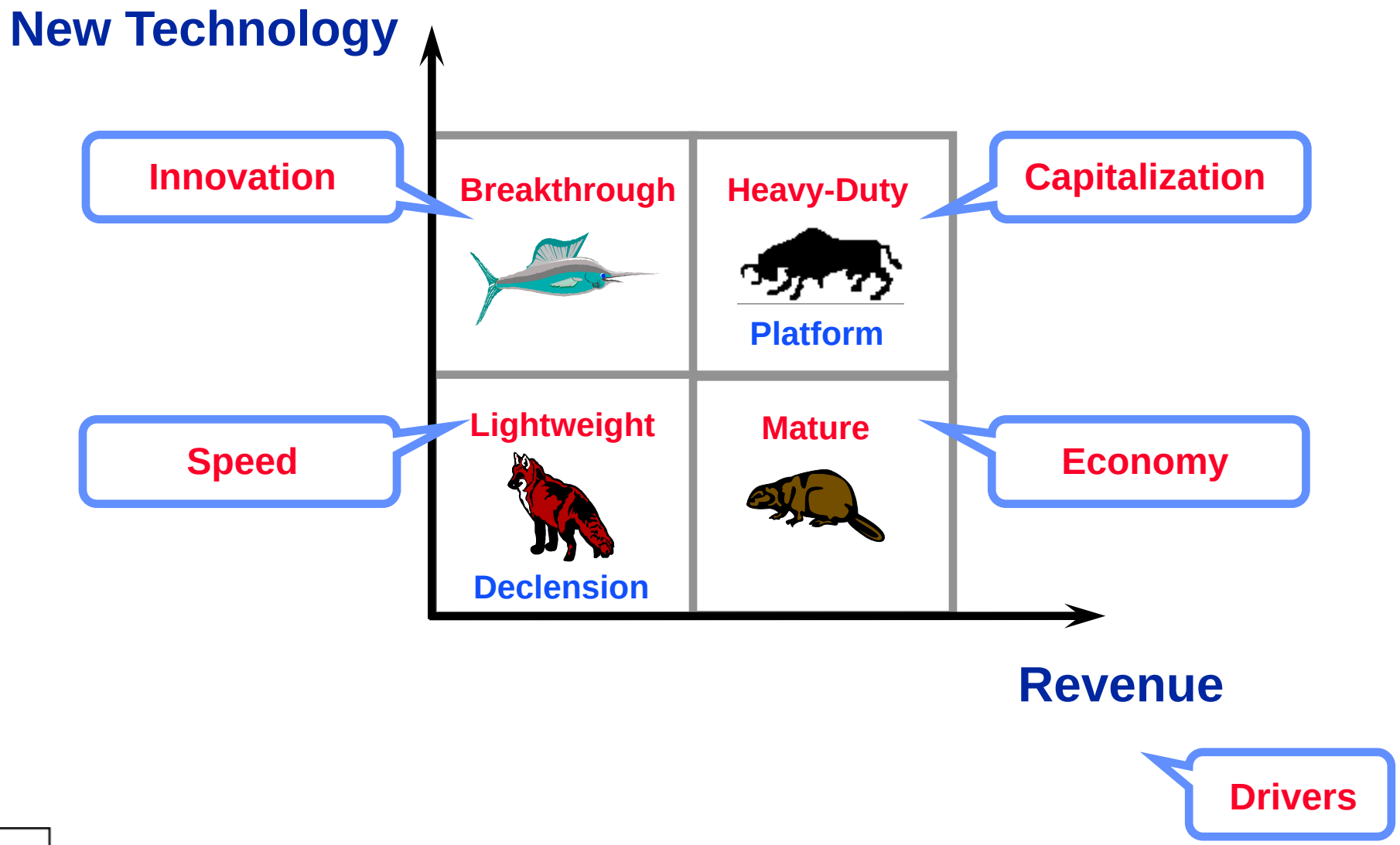
Distributed Matrix Organization



A New Deal to Change the Game

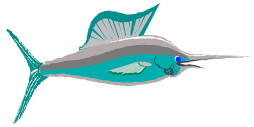


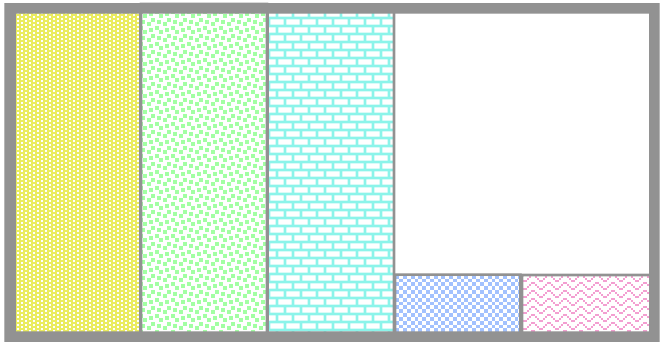
The 4 New Processes



Modulated Product Development Guidelines

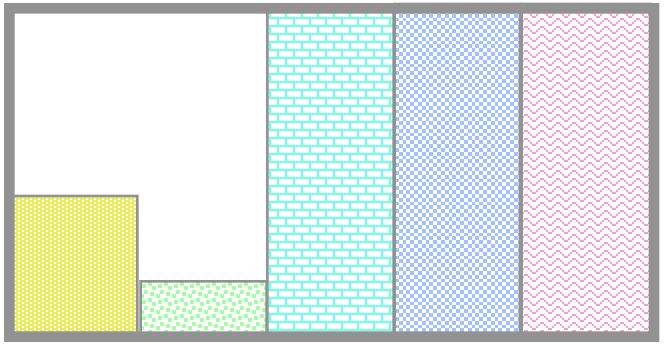
Breakthrough





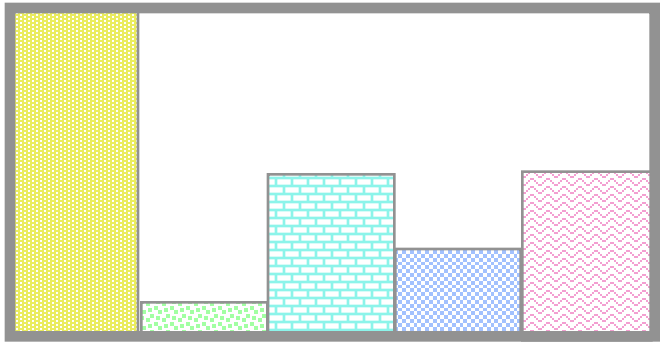
Marketing Design Integration
Feasibility Industrialization

Heavy-Duty



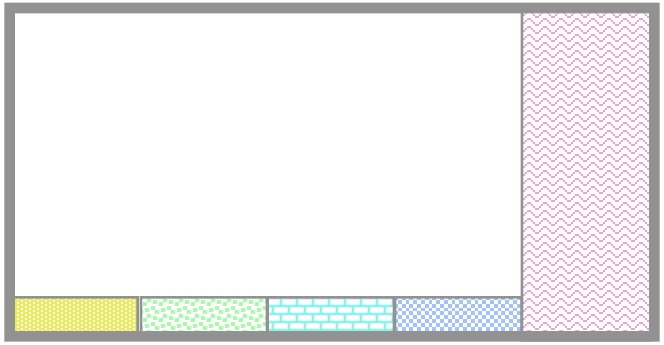
Marketing Design Integration
Feasibility Industrialization

Lightweight



Marketing Design Integration
Feasibility Industrialization

Mature



Marketing Design Integration
Feasibility Industrialization

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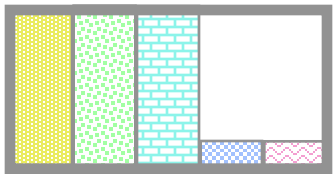
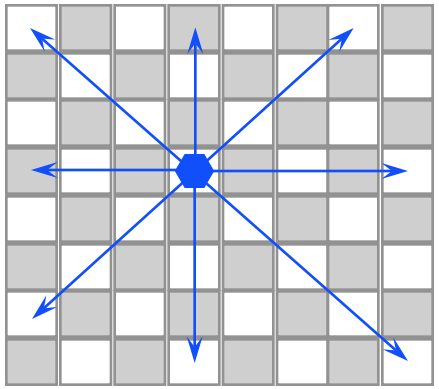
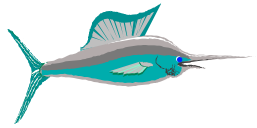
Modulated Standards

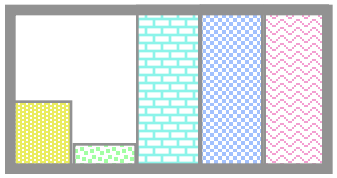
Breakthrough

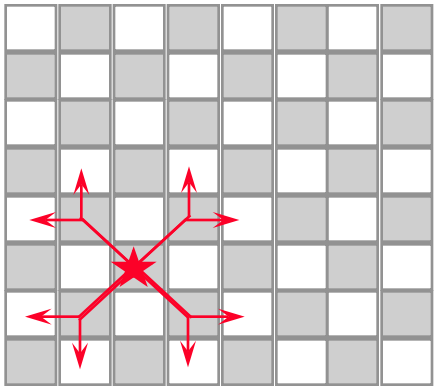




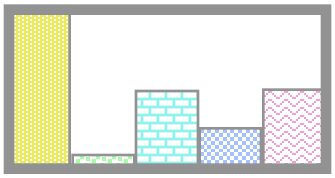


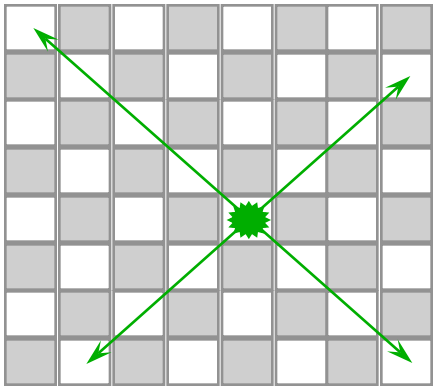
Heavy-Duty



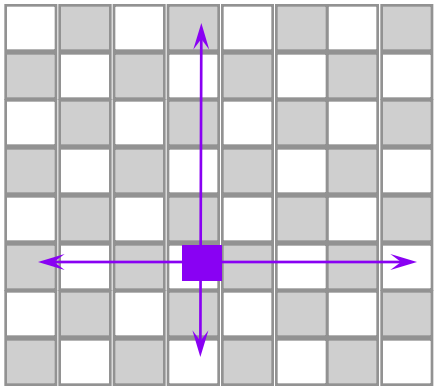


Lightweight





Mature



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

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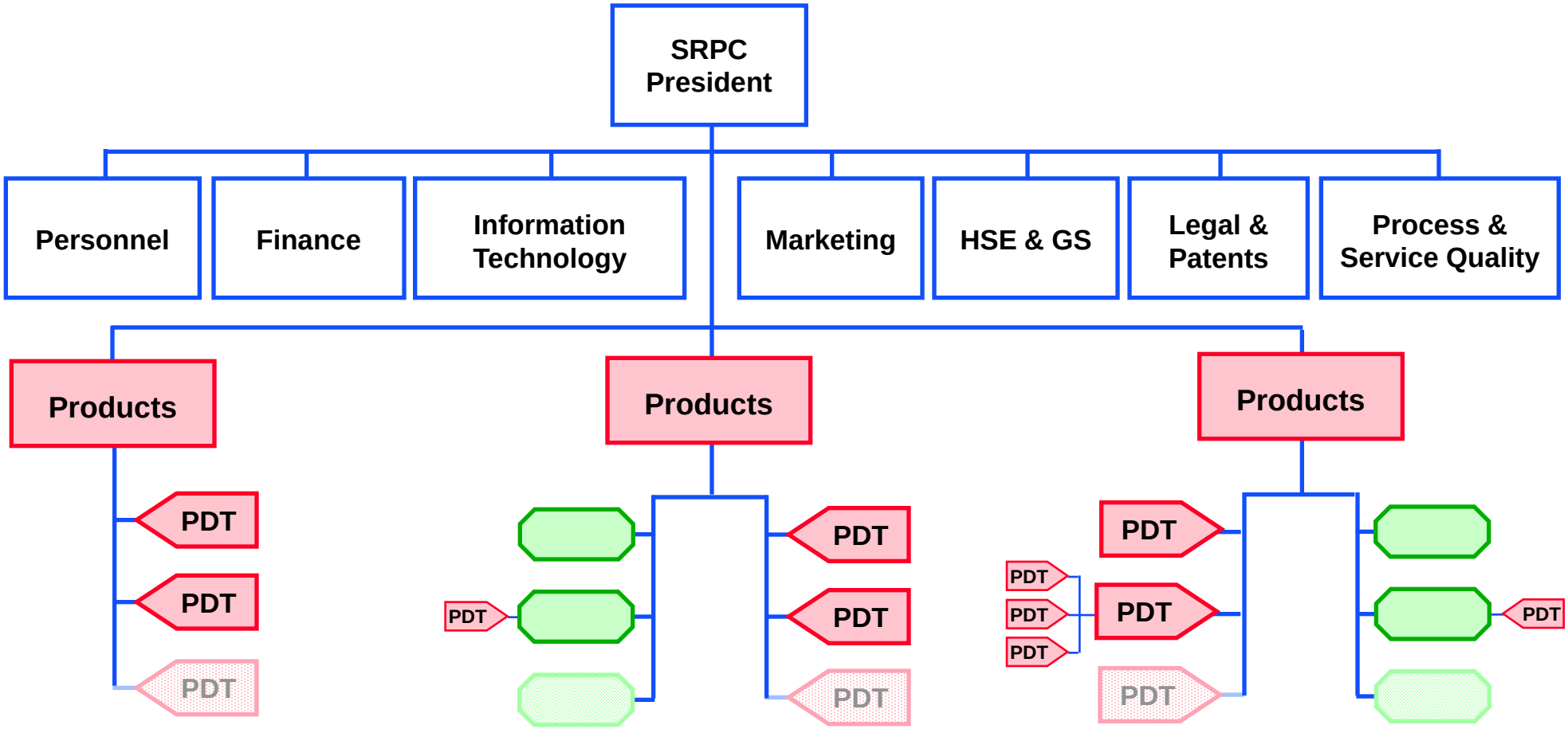
What's Next?

- Virtual R&D, Sunshine Engineering

Structure


SRPC President
Personnel
Finance
Information Technology
Marketing
HSE & GS
Legal & Patents
Process & Service Quality
Products
Products
Products
PDT
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Metiers
Sensor Physics
Electrical
Mechanical
Chemical
Acquisition / Interpretation
Integration
Logistics

Reaching World Class within 3 years

Leader — Internal with partner — External

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

Reaching World Class within 3 years

External

Internal with partner

Leader

Metier	Definition	Three year milestones to World Class	Leader	Internal with partner	External
Sensor Physics	Understanding measurement physics and its implementation in products	• Risk assessment • Research integration	★		
Electrical	Design and packaging of high resolution & high temperature electronics	Make available new low cost processes		⬢	
Mechanical	Design & qualification of sensors sub-assemblies for hostile environment	Mastering & implementing new low-cost mechanical processes		⬢	
Acquisition / Interpretation	Real-time acquisition & data evaluation	Global inversion in 4 dimensions	★		
Integration	Organization of internal & external resources for product integration	Global subcontracting strategy	★		

Challenge 1: Simplifying our business process

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

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.