Ford Motor Company

Collaborating for Superior Products

Richard Riff,

Global Product Creation Systems, Director

Henry Ford Technical Fellow

Ford Motor Company

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Collaborating around a Common Purpose

Question:

What do you call it when a group of people get together just to share?

Answer:

Gossip !

Successful collaboration begins with having a clear and attainable goal for the collaboration.

- For Ford, successful collaboration cannot end at producing technically superior products efficiently.
- Successful collaboration must be gauged by its influence on marketplace performance.
- Ford is attempting to align loose, ad-hoc, and isolated collaborative efforts to a common enterprise vision for collaboration

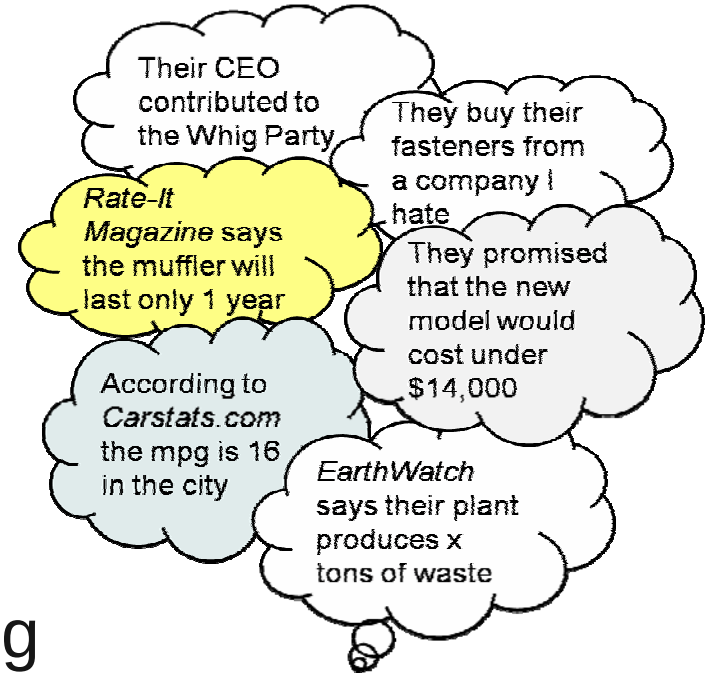
Ford Collaboration

Collaboration at Ford means building a synergistic relationship between ***external*** and ***internal*** concerns in order to produce better and *more successful* products

Meeting this mandate requires *great teamwork*

Why Collaborate Externally? Consumer/ Market Demand

Production – Sales
= **Scrap**



In today's environment of free-flowing information, meeting consumers' expectations and demands involves much more than just a good product.

Making consumers and business partners an active part of product creation has become essential to marketplace success.

Why Collaborate Internally? Productivity & Efficiency

- **To uncover partitioned & hidden *Enterprise Knowledge* by*:***
  - Dismantling “information silos” to enable effective decision making
- **To unleash the Potential of Experts by:**
  - Promoting and increasing the cross-functional participation of our experts
- **To build and preserve Collective Intelligence by:**
  - Capturing & leveraging key experiences from our sizable and diverse community
- **To promote Creativity & Innovation by:**
  - Harnessing the “wisdom of the crowd” to enable Ford’s collective intelligence to be applied toward creative efforts

Business Drivers for Collaboration

Globalization

Design, build, maintain anywhere at anytime.
Special segment appeal and cultural fit.

Product Variety/Complexity

Increased product features.
Maximize product reuse.
Extensive customization, build-to-order, ease of use.
Increase product effectiveness.

Competition

Product differentiation
Swift Innovation and implementation.
Consolidation & focus on core competencies.

Cost & Price Pressure

Lower cost of failure.
Control cost of making.
Demand for global pricing.
Provide quality at lower price.
Decreased product margins.

Collaboration: A Knowledge Environment Demand

Information =
Potential Power

So …

An environment of free-flowing information means …

… an environment of free-flowing ***power creation potential***.

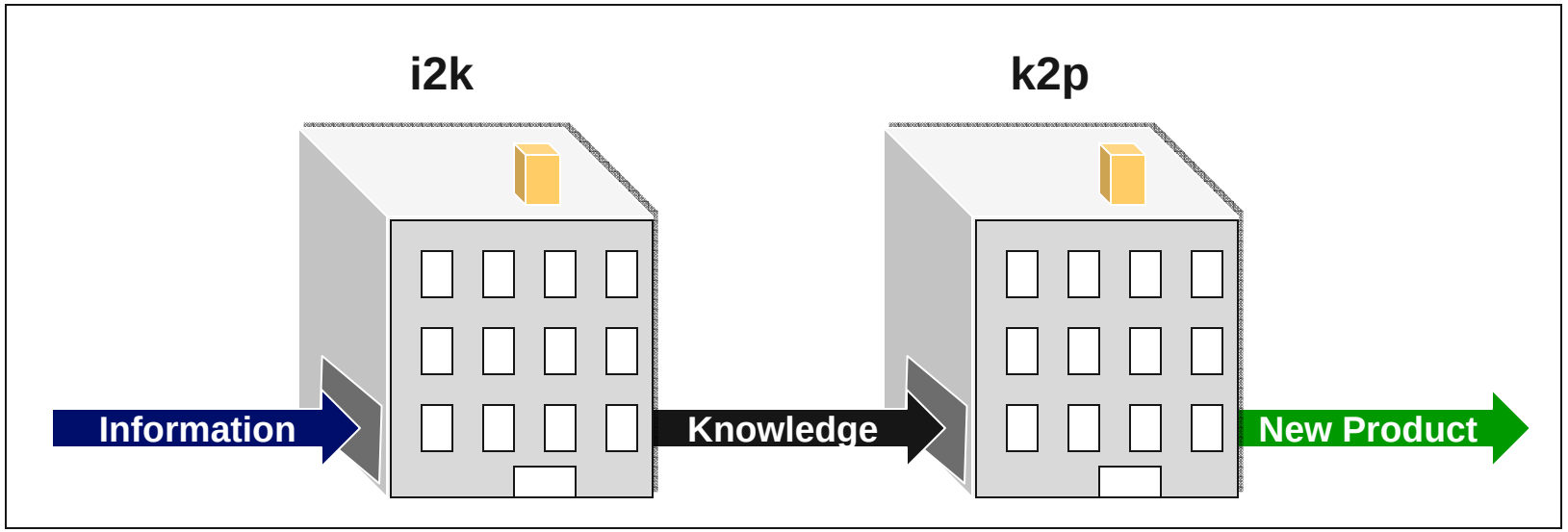
In today's knowledge environment the advantage is with those who can make the most from what is quickly becoming: a *shared* global information pool.

- Business collaboration, in all of its forms, serves to enable Ford to better compete by getting more bang from available resources.
- There must be *"collaboration amongst collaboration efforts"* around a common vision, and the common goal of competitive success.

Collaboration Challenge: Knowledge Creation & Use

Competitive pressures demand continuous improvement in *two* critical production areas:

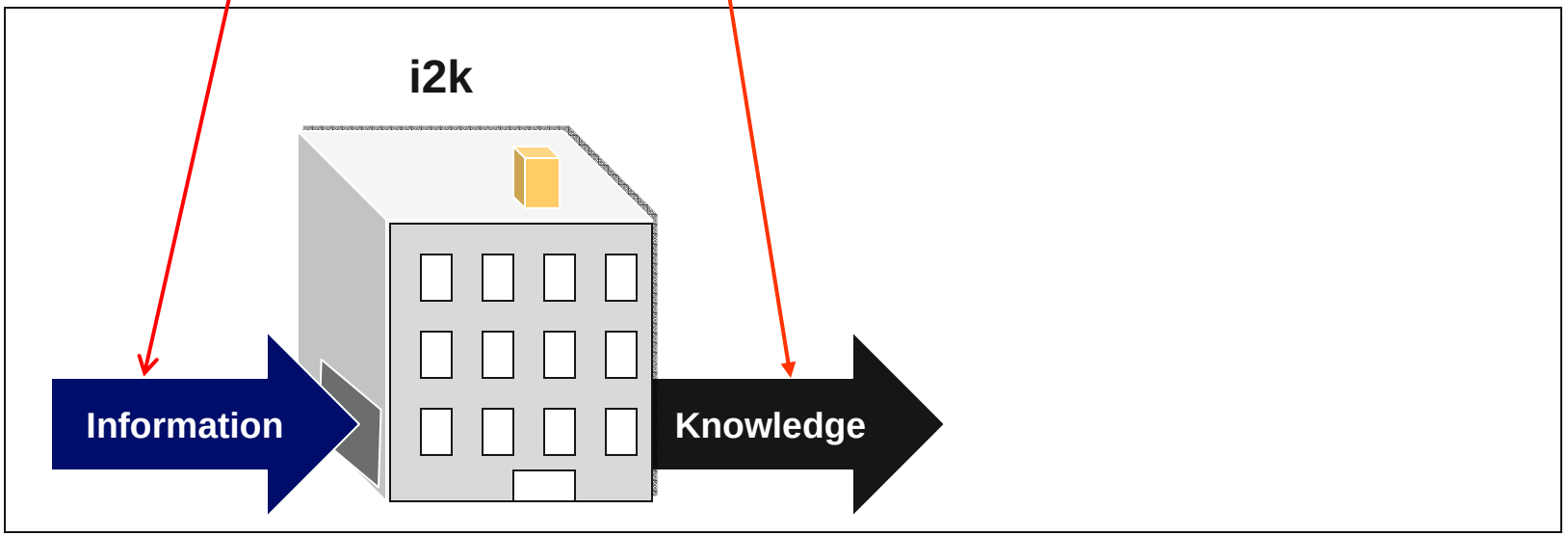
1. **Information-to-Knowledge (*i2k*) conversion**
2. **Knowledge-to-Product (*k2p*) creation**



Collaboration Challenge: Inclusive Creation

Information used to create company knowledge should represent the concerns & perspective of:

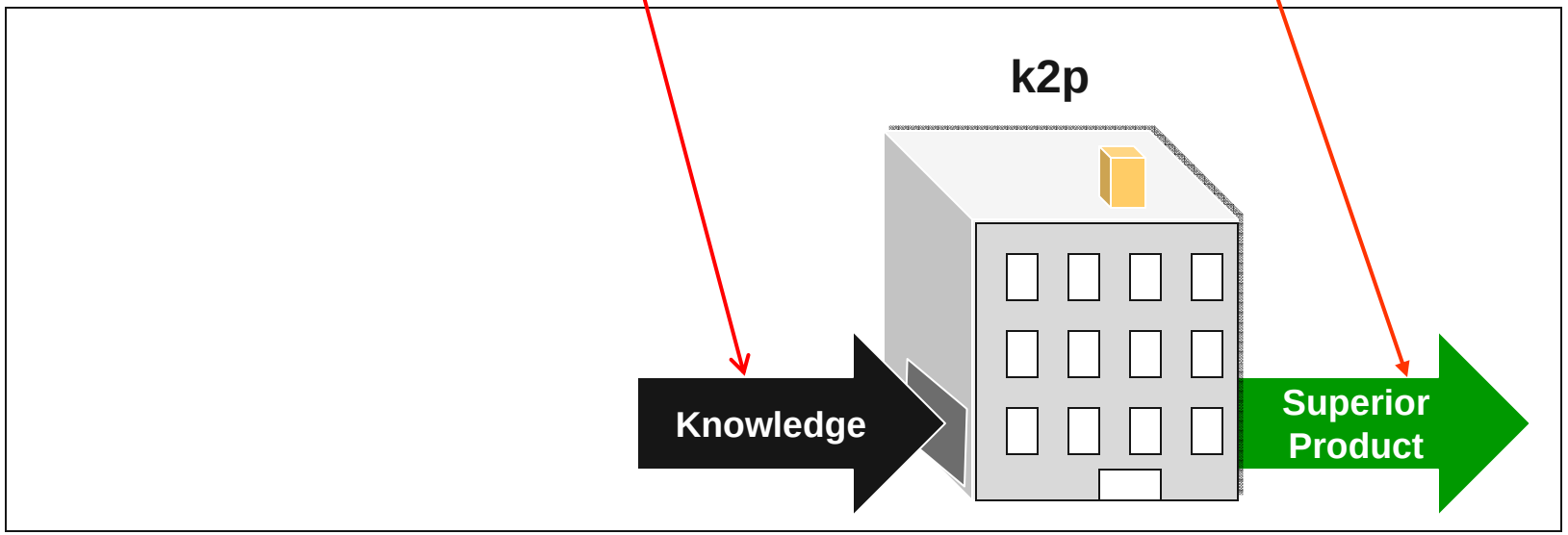
- **Customers,**
- **Suppliers and Partners,**
- **Employees,**
- **and the Marketplace in general**



Collaboration Challenge: Effective Usage

Knowledge created should better support :

- **Needs & Expectations of Consumers**
- **Decision-Making**
- **Product Development**
- **Overall Operations**



Collaboration strategies and tools serve to meet either or both of the following roles:

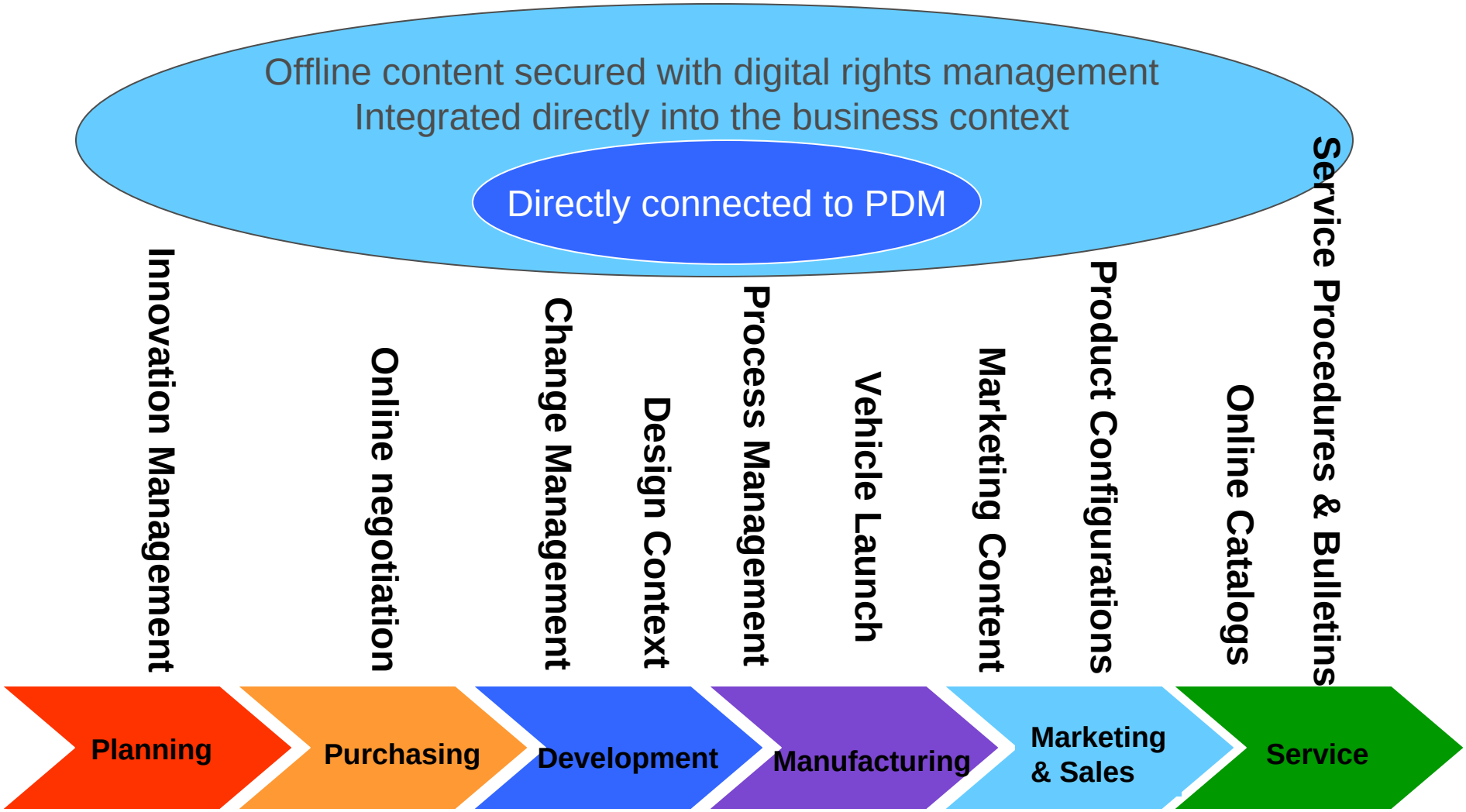
1.Fostering Community Creation & Development

- External community development
- Internal community development

2.Enabling Community-driven improvements in:

- Knowledge Creation
- Innovation
- Problem-Solving
- Problem Prevention
- Leadership (Decision-making)
- Efficiency
- Knowledge Retention

Collaboration between Business Units

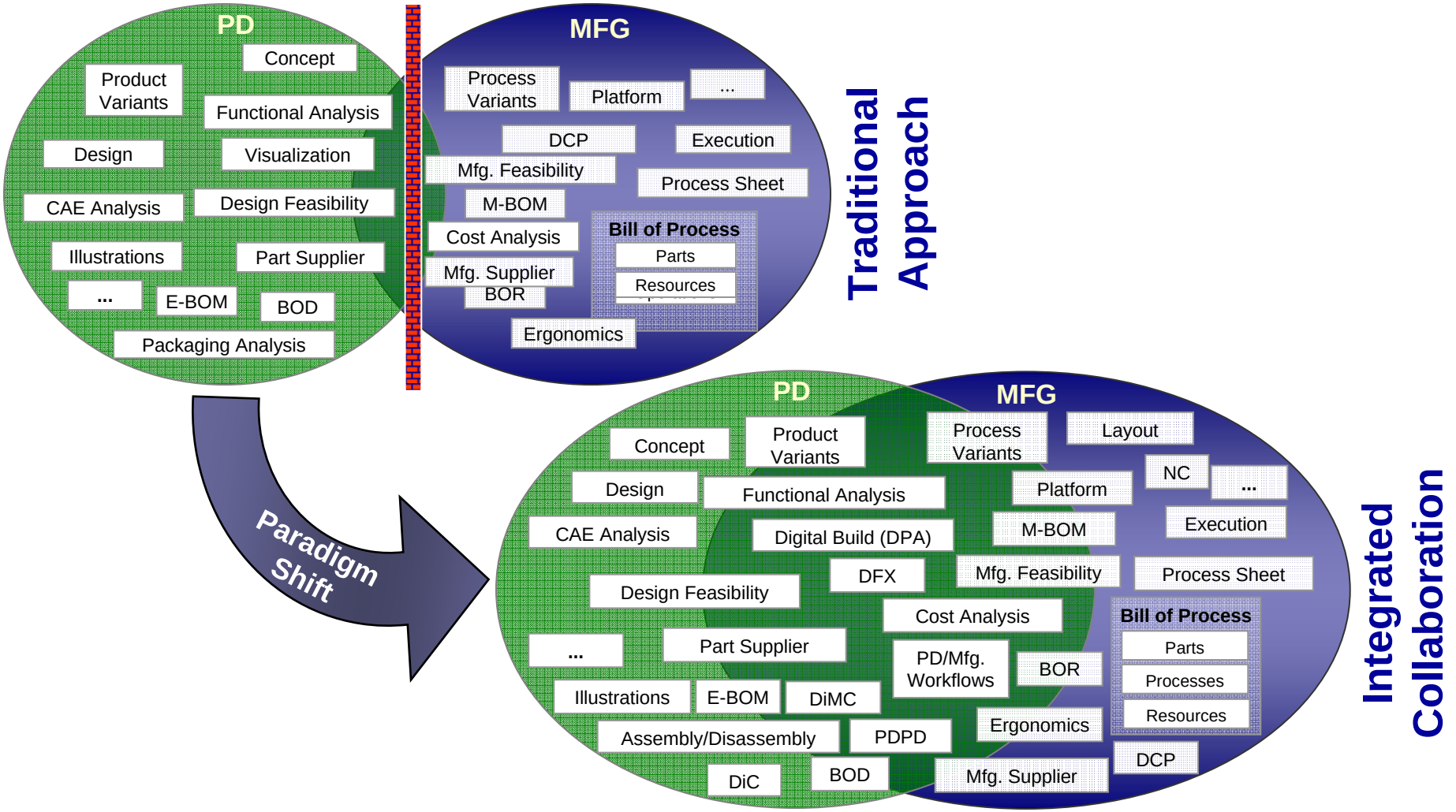


Key Messages:	• Need to be able to extend the reach of our 3D data securely while integrating it directly into specific business contexts

Collaboration between Cross-Functional Teams

Key Messages:	• Build environments that are flexible enough to support a variety of uses on a common platform

Collaboration between Product Development & Manufacturing



Key Messages:	• Seamless global collaboration across all organizations • Design driven cost optimization through front loading of downstream knowledge • System engineering approach of integrated product development process

Collaboration for Product / Process Compatibility

Process Driven Product Development:

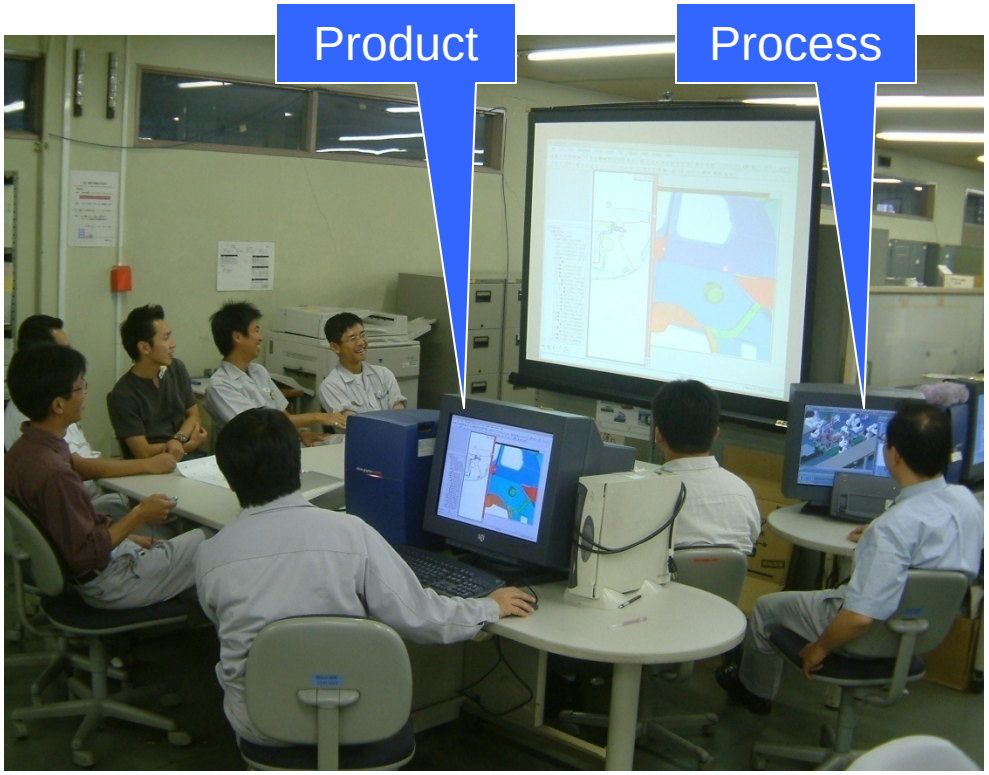
Geometric compatibility between product design and manufacturing process / facility & tools utilize 3D graphics and simulation technologies

"Virtual Build" events may be formal program milestones with the participation of senior management, or small informal desk-side meetings to quickly resolve an issue prior to any hard construction

Plants and suppliers may participate via remote interactive screen sharing sessions

The use of 3D visual technologies have proven valuable for both issue avoidance, and for clear communication at 1/10 the cost of 2D paper processes

Laser scanning and live video up-links are being increasingly used to bring plant information back to engineering



Key Messages:	• 3D based communication brings substantial efficiency to cross organization and long distance design reviews

Collaboration with Suppliers Through Data Portals

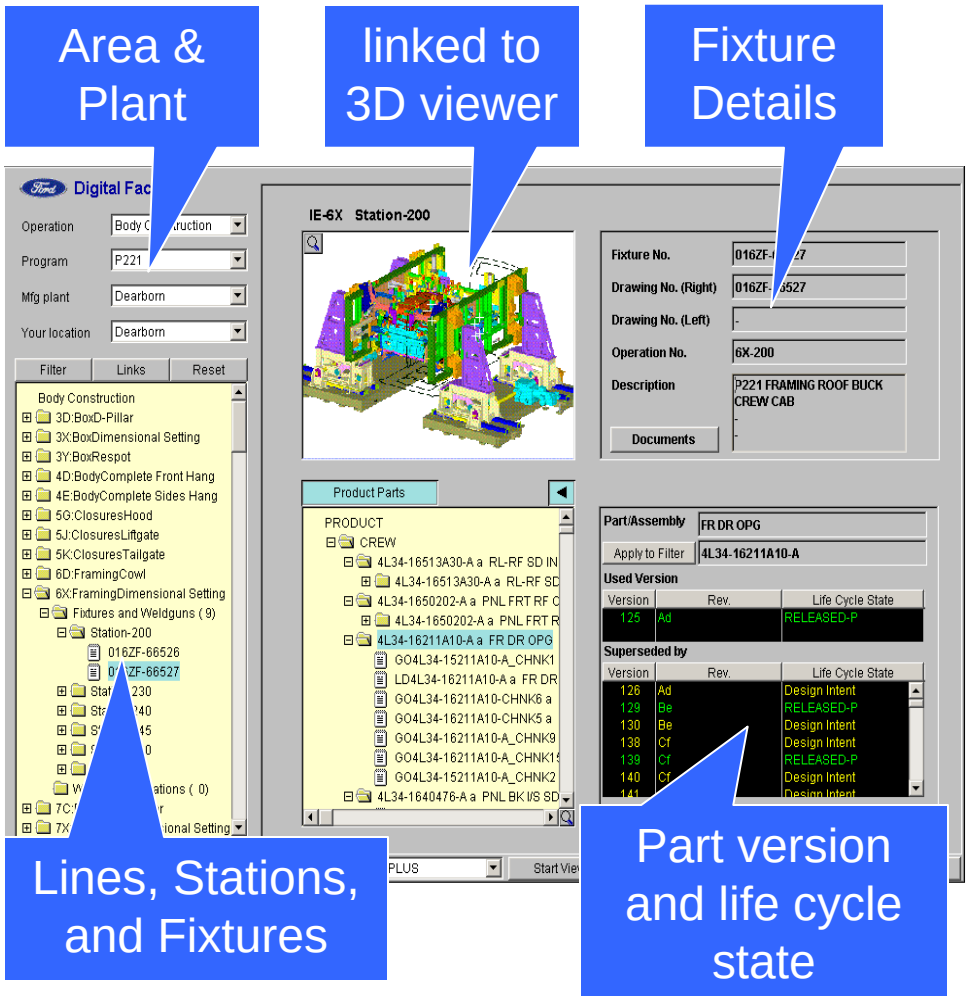
Supplier Data Delivery Tracking:

Body tooling suppliers deliver virtual representations prior to and evolving with physical tools

Portals provide a means to track and collaborate “offline”. Much of this engineering information is NOT 3D (e.g. part version and life cycle state)

The state of the design can be quickly assessed, and the impact of potential part changes evaluated without disrupting the supplier

Similar collaboration is being used through our enterprise PLM system between PD and Manufacturing, where relevant manufacturing facility/tool/resource and process data are linked to parts, and may be traced through by PD

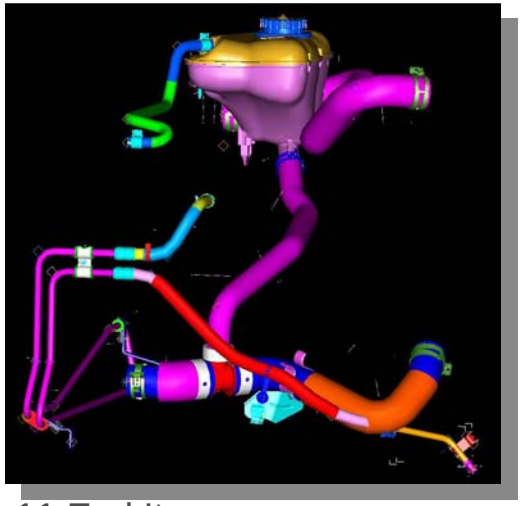


Key Messages:	• Portals provide a traceable record of communication with data that can be utilized at any time • Caution should be exercised to prevent uneducated browsing from leading to wrong conclusions

Collaboration with our Supply Chain

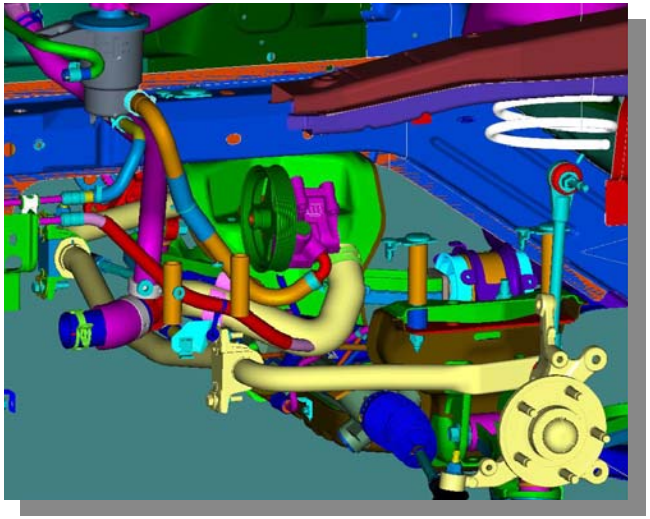
Design in Context: The Challenge for Suppliers

A small set of parts to design:



- 11 End Items
- 80 CAD Files, 399 Versions
- Average of 0.44 versions per day

In an extremely complex environment:



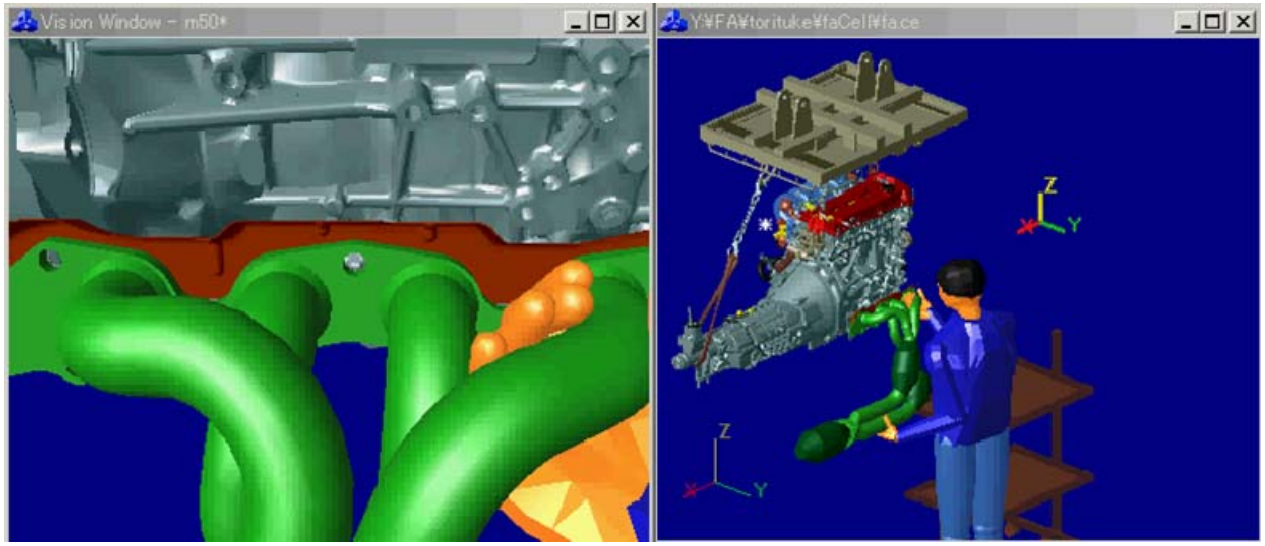
- 43 Assemblies, 2424 Versions
- Average of 1.73 versions per day
- ~30 minutes per download
- 4.3 hours per week for downloads

Key Messages:	• Increase the utilization of lightweight visualization as an alternative to CAD • Improve the ability to conduct online design reviews • Reduce the barriers that inhibit the direct integration of external design teams

Collaboration for Problem Prevention

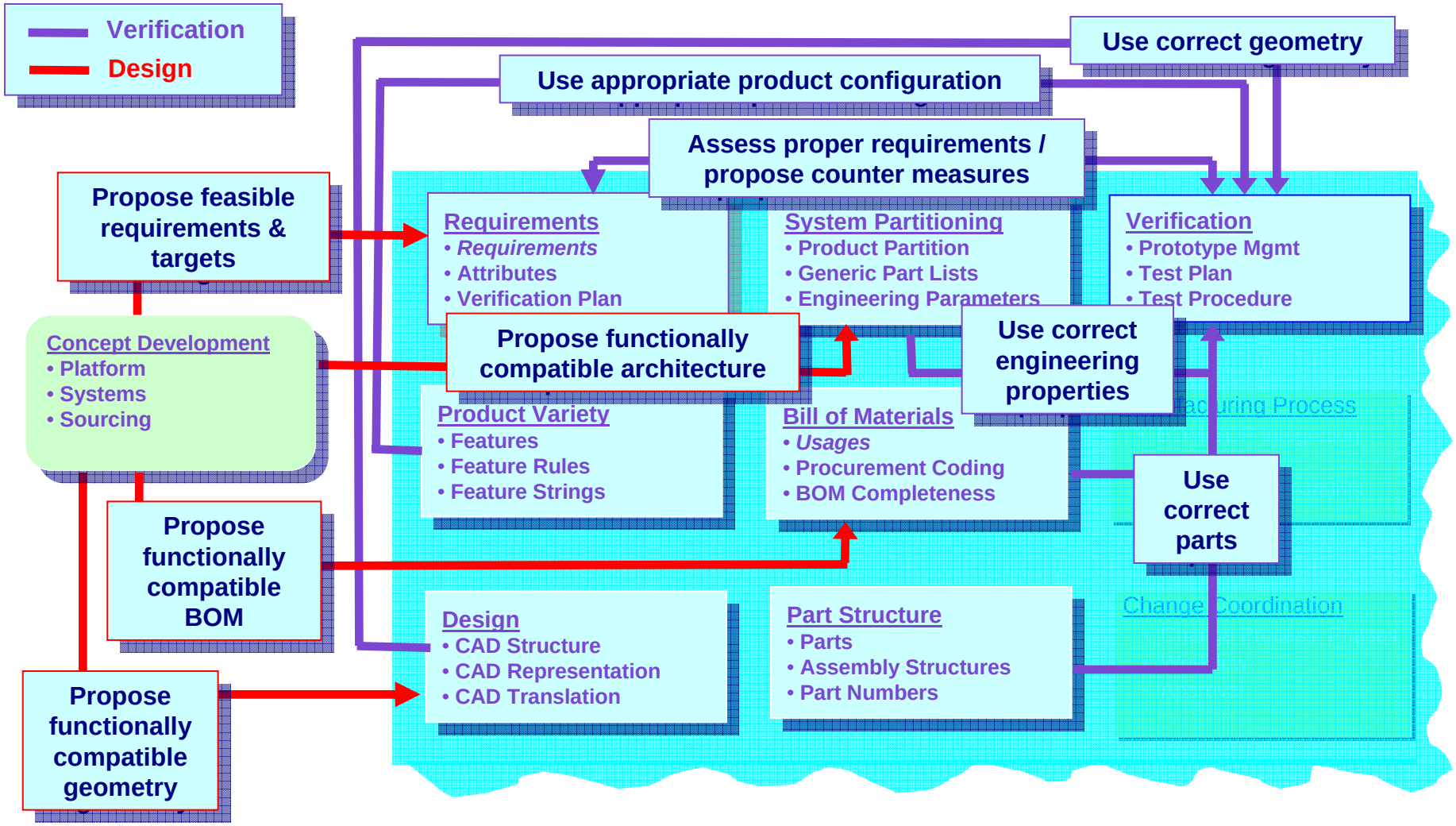
Diffusion of Best Practices:

By capturing and presenting lessons learned in more dynamic, interactive, and accessible ways we lower the learning curve associated with mastering new engineering and manufacturing techniques. The result is more trouble avoidance and less trouble-shooting.



Key Messages:	• Technology does not have to be leading edge to improve problem prevention , strategic use of pictures, audio, video and other content can greatly reduce errors when aligned with a comprehensive collaboration vision

Collaboration for Design Development & Verification



Key Messages:	• Seamless global collaboration across all organizations • Support critical Engineering Information interactions • Enable Tradeoff between competing requirements and design options

Collaboration for Efficiency (Complexity Reduction & Commonality Promotion)

Maximize the reuse of proven existing parts, assemblies, equipment and process

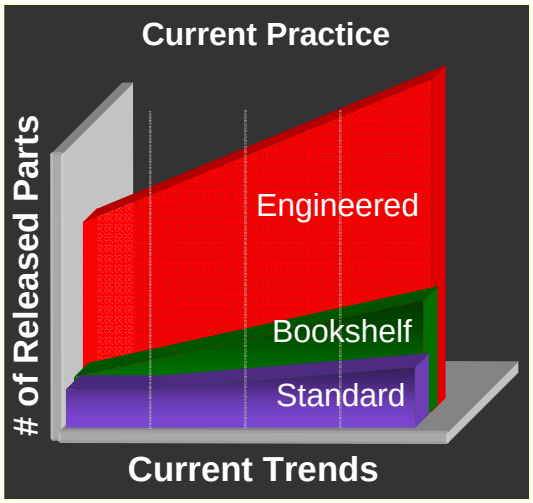
INNOVATE MORE
Give engineers more time to engineer by reducing the re-invention of proven designs

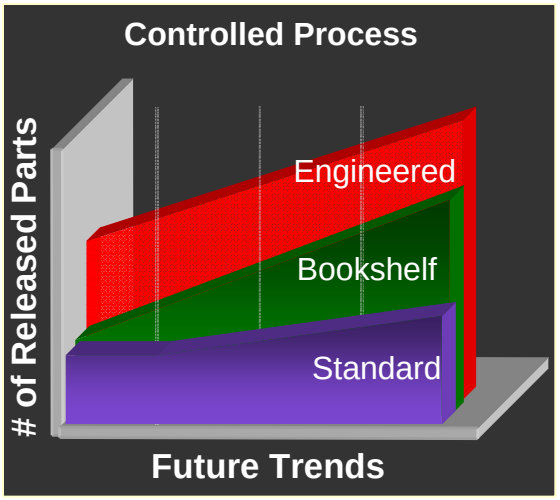
MOVE FASTER
Rapidly ramp up new product development through commonization strategies

GO GLOBAL
Standardize components from within the global value chain

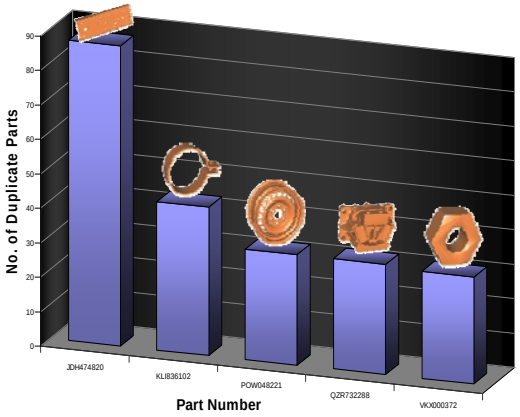
REDUCE COMPEXITY
Leverage existing components in multiple products to reduce development & part costs

BE COMPLIANT
Eliminate validation activities by utilizing previously certified parts

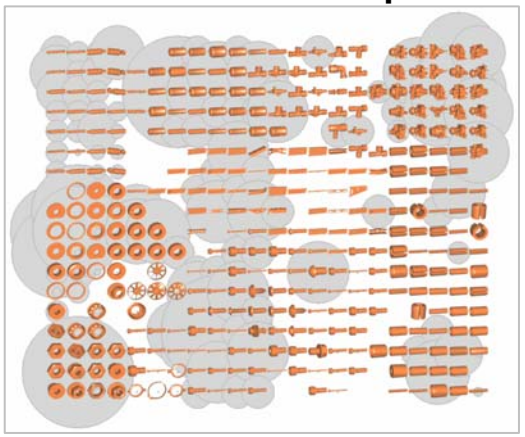




Duplicate Part Analysis

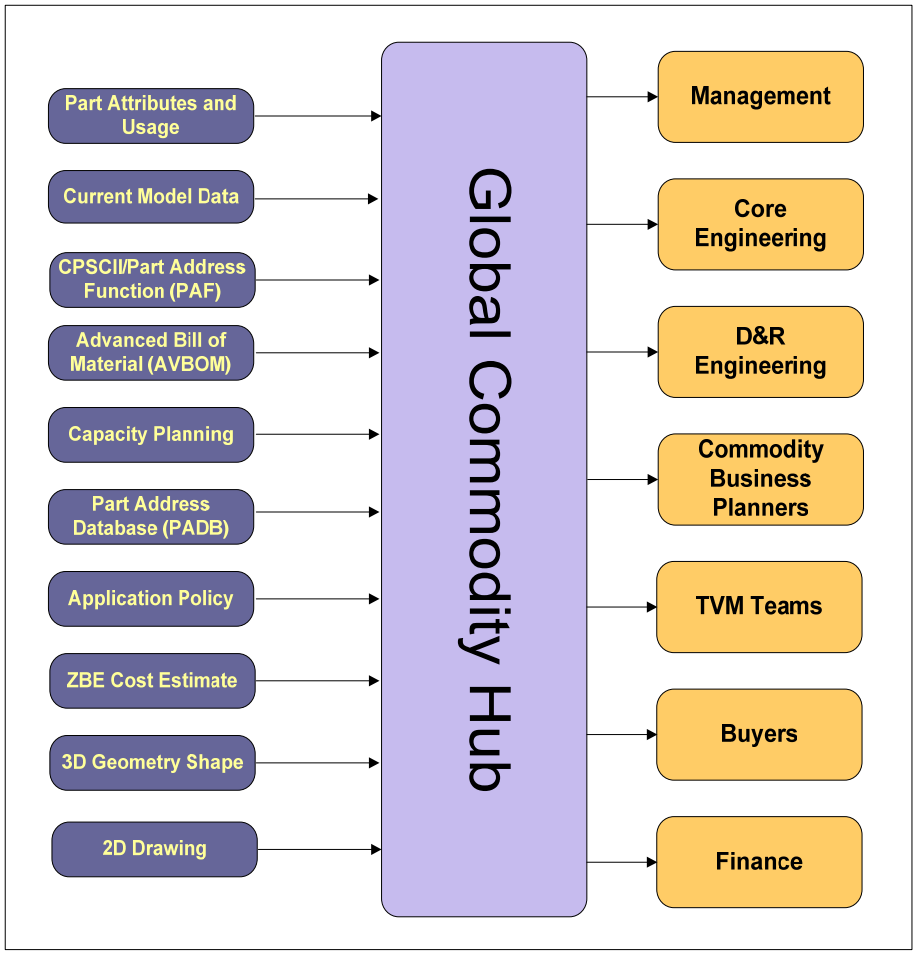


Part Cluster Map

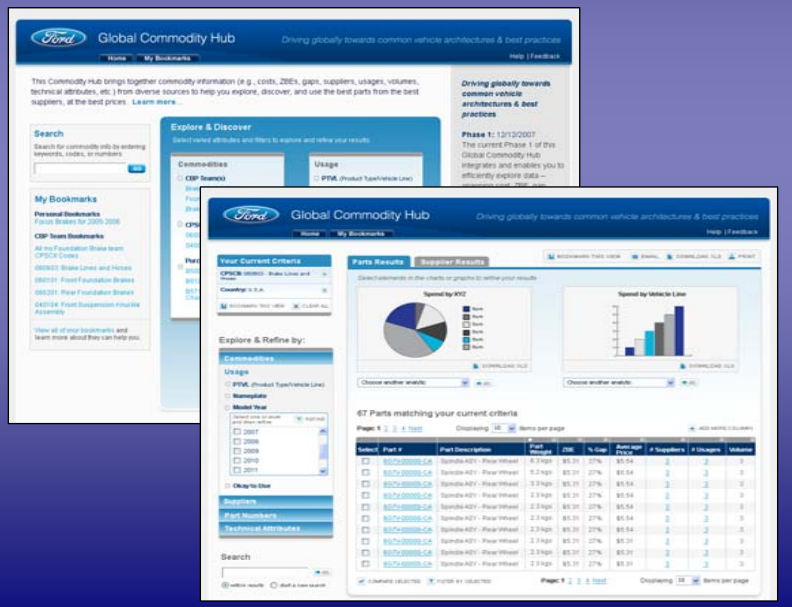


Key Messages:	• Promote commonality without sacrificing innovation • Consistency in quality (reduce noise and variations), Increase first pass success, reduce system cost

Collaboration for Process Integration Across Functions



Automatic federation of critical commodity information and an easy to navigate view of various attributes, data, and metrics, along with the basic analytical capabilities



Key Messages:	• Enable cross-functional analysis and decision support for business workflows • Drive enterprise wide investment decisions, rather than program-based decisions • Decrease part proliferation and improve corporate commonality metrics

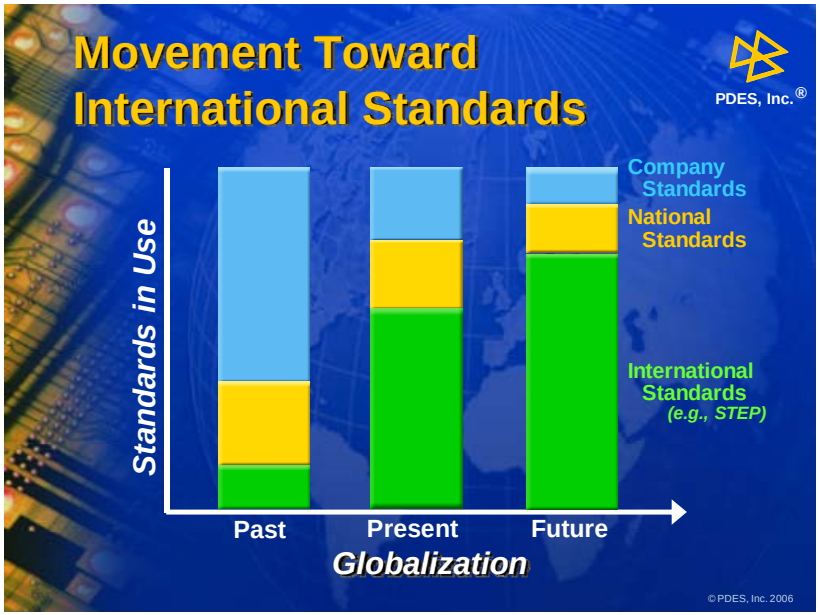
Collaboration for Tool & Systems Interoperability

Interoperability Challenges:

- Lack of interoperability between tools
- Information loss during transfer from system to system
- Differences in underlying information models
- Multiple standards require translations
- Manual information entry is prone to errors

Implementation of Standards:

- Standards such as PDX work for limited scope/scale
- But – which standards to converge on?



Adaptive Interface Development:

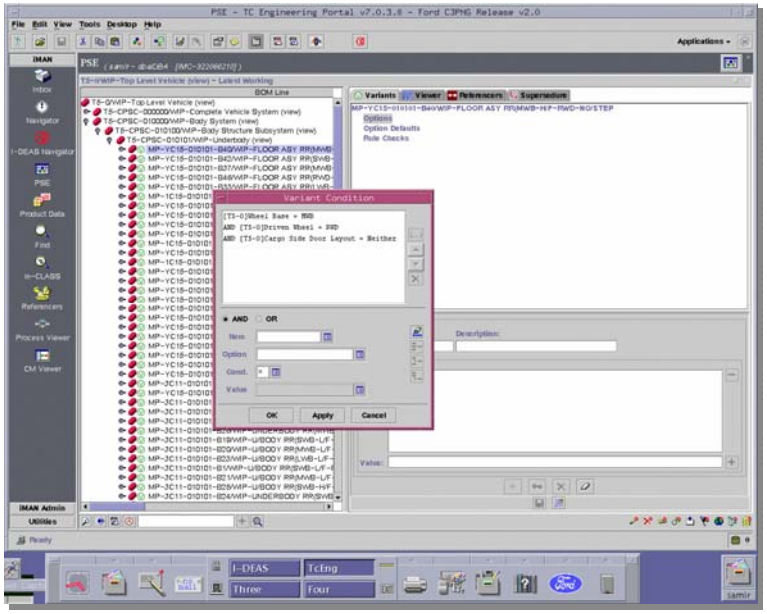
- Semantic approaches can be implemented to reduce the reliance on standards
- But not sufficient agreement on upper ontologies for collaboration yet

Key Messages:	• Standards are critical • Adaptive Interfaces must be leveraged for “Plug & Play” functionality

Collaboration for Process Interoperability

Implemented *Early Bill of Material System* as a collaborative improvement over the use of spreadsheets

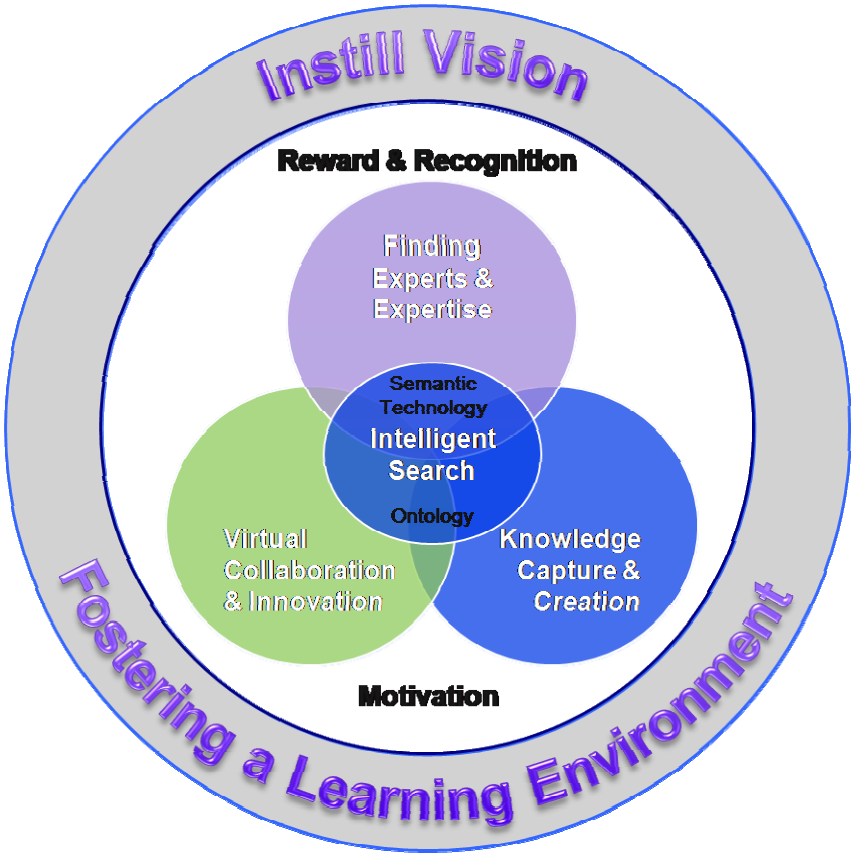
- EBOM serves as a single shared authoritative source that offers:
  - Format Consistency
  - Up-to-date BOMs
  - Easy BOM publishing
- Enabled improved collaboration with extended enterprise business partners
- Supports a variety of uses on a common platform



Key Messages:	• Enables the design of context into Early BOM Systems

Collaboration on Corporate Learning

- Make ***enterprise knowledge*** available
  - Finding Experts & Expertise
  - Intelligent Search with Semantics
- Accelerate ***virtual collaboration & innovation***
  - Community Driven Problem Solving & Prevention
  - Knowledge Powered Innovation & FMEA
- Formalize ***knowledge capture & creation***
  - Tacit Knowledge Transfer
  - Knowledge Circles (social networking)
  - Knowledge Preservation

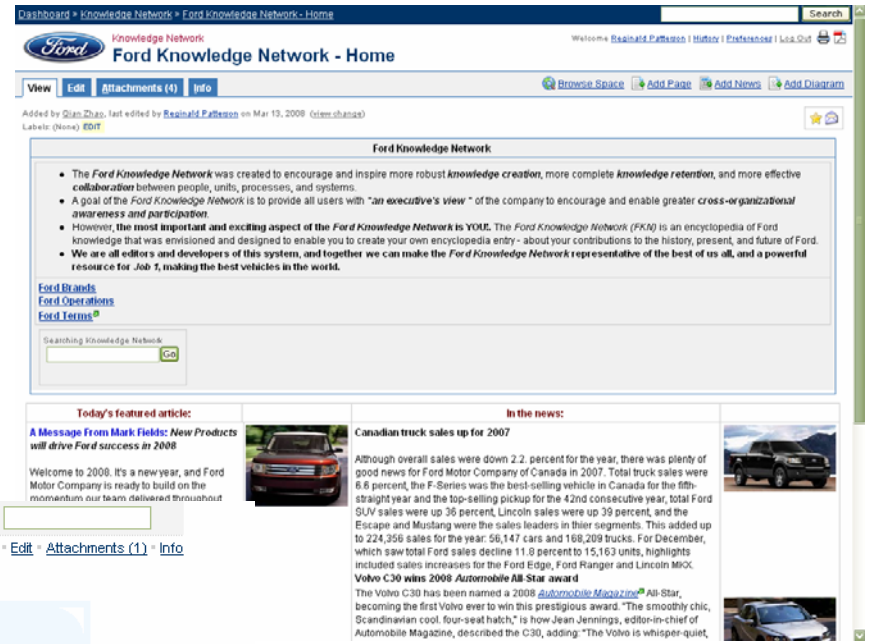


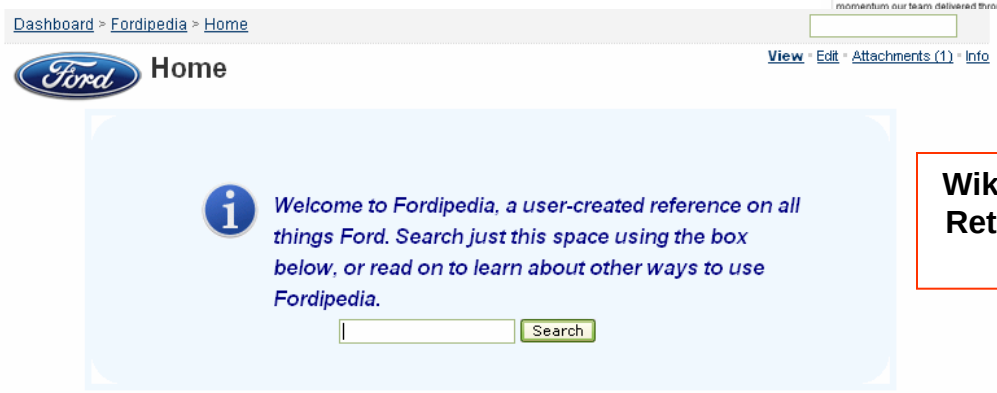
Key Messages:	• Fostering a learning-enabled organization for knowledge creation, discovery & innovation • Corporate learning is supported and enhanced by making the community an active participant

Collaboration for Knowledge Retention

The arrival of a knowledge-based economy has made *knowledge asset management* more critical as a competitive and survival necessity.

Ford is enabling knowledge capture and retention via social tools that personalize virtual interaction.





Wiki-based Knowledge Retention & Reference Systems

Key Messages:	• Successful collaboration involves a mix of enablers to empower people to develop relationships more "naturally" • Internal knowledge stores are greatly enhanced by making knowledge capturing unobtrusive

Collaboration for Innovation

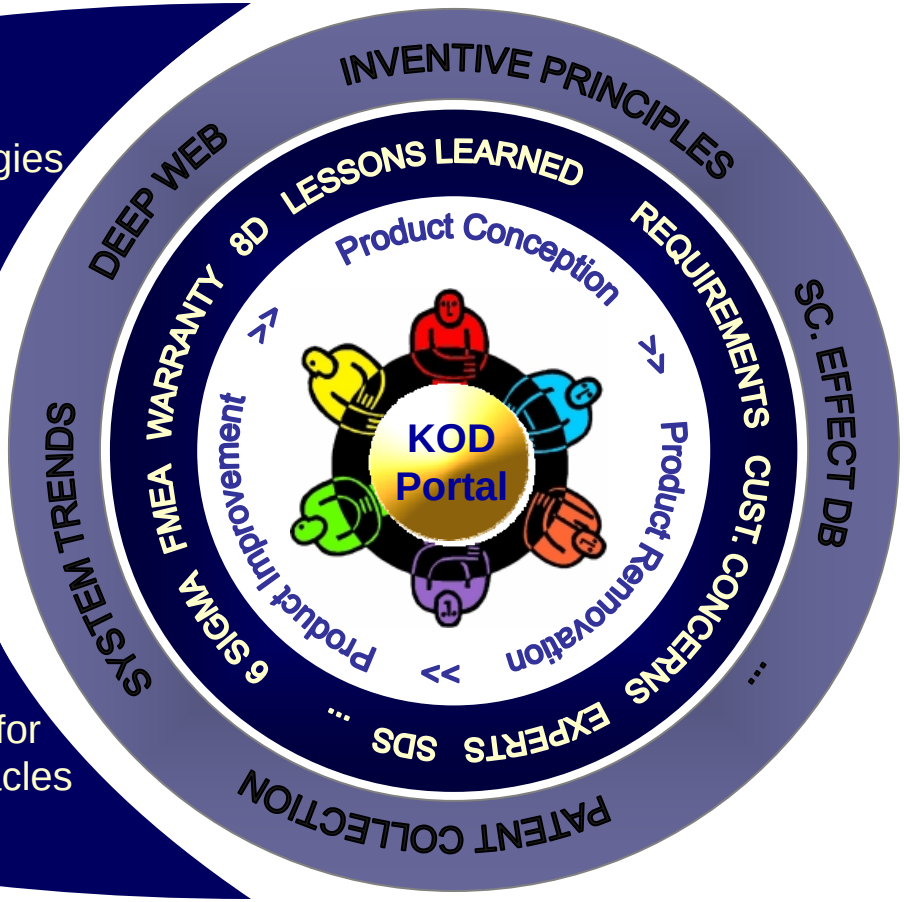
Automate & empower innovation methodologies

Leverage collective intelligence by participative and collaborative approach of problem solving

Enhance the innovation creativity with structured and repeatable processes

Enable comprehensive problem understanding and conceive more & better ideas/solutions

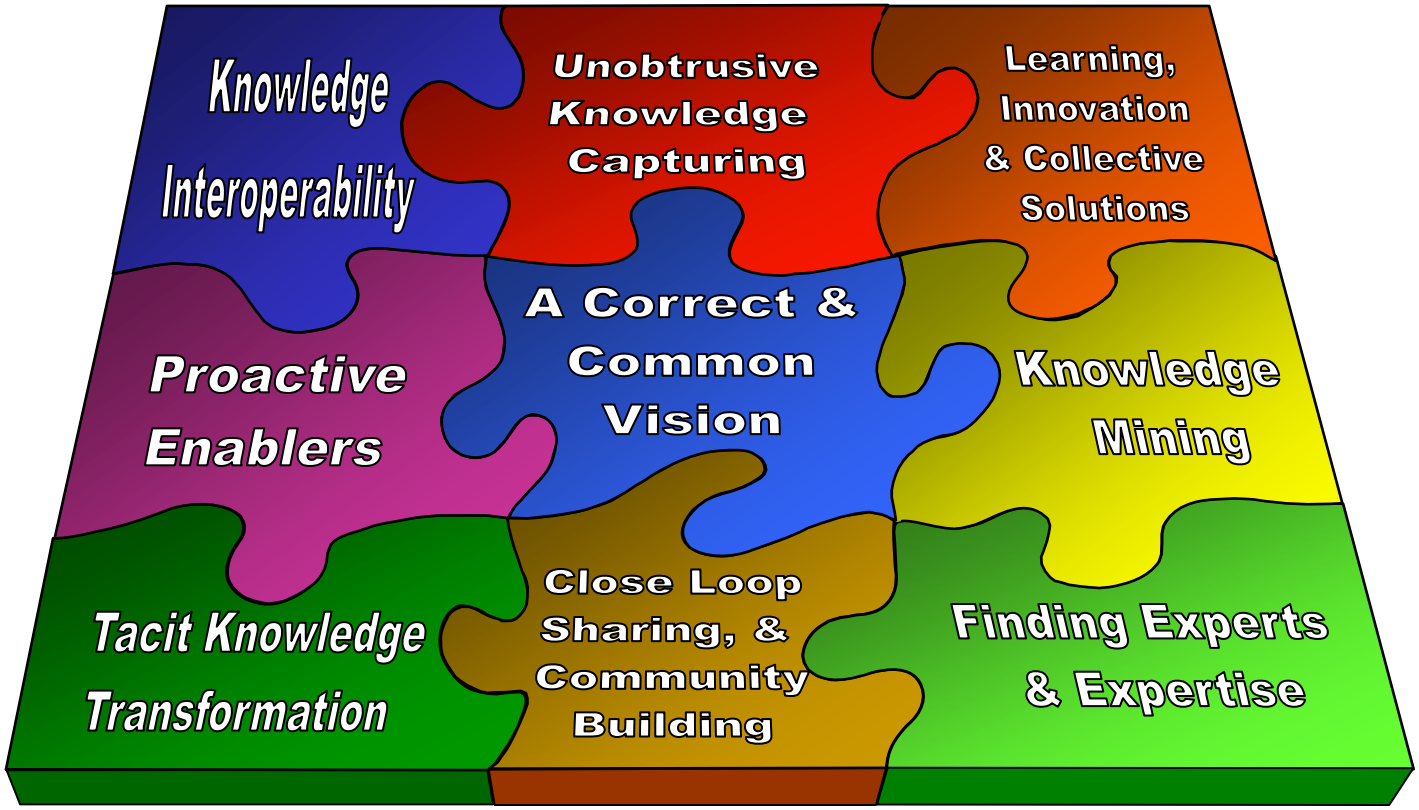
Enable creative thinking for defeating technical obstacles



Key Messages:	• **Structured Innovation:** Repeatable processes to conceive more high-quality ideas & solutions • **Knowledge Enabled Innovation:** Precision research and integrated knowledge accessed from multiple sources • **Collective Innovation:** Collectively leverage corporate expertise & external technical sources

Collaboration for Leadership

Ford's collaborative environment is attached to a set of goals & principles intended to incorporate collective wisdom into solutions and decision-making



Key Messages:	• Ford's goal is to make the Knowledge-on-Demand to our people and processes richer, more "knowledge-ready", and reliable for accurate decision-making • Collective intelligence creates better leadership

Summary

- Superior products are defined by consumers
- *Openly available* and *equally accessible* information has enabled greater competition from competitors large and small, making collaboration and other efficiency measures more critical.
- Collaboration activities should be inclusive of the inputs of those affected by the collaboration effort, including suppliers and those in the marketplace, whenever possible.
- Collaboration efforts should be aligned and coordinated around a common enterprise vision to avoid a “clash of collaboration efforts”.
- Standards are critical to improve global collaboration
- Adaptive interfaces must be leveraged for interoperability


Thank You
Flex
Coming Summer 2008
Seating for up to seven
Multi-Panel Vista Roof™*
Refrigerated console*
Two-tone roof*
*Available