Visual Decision-Making
Using Visual Information to Improve Design Decisions

Joe Barkai
IDC Manufacturing Insights

SEPTEMBER 12 -14
2010 International Conference
Scary Statistics

- 20% of projects are over time
- 35% of product companies had experienced at least one runaway project
- Most products fail to meet expectations
  - Only 25% of projects result in a product that reaches the market
  - Two thirds of those do not meet expectations
- 45% of the resources allocated to product development and commercialization are wasted
Why Is It So Difficult to Make Decisions? Effective

Customer Demand, Differentiation

Time to Market Pressures / Shortening Lifecycles

Shrinking Budgets

Outsourcing

Aging Workforce

IP Management

Technology Complexity

Operational Complexity

Compliance

Knowledge Deficit
Decisions, Decisions, Decisions…

- **Research**: Minimize Time & Costs, Maximize Reuse
- **Design**: Maximize for Performance, Quality & Compliance
- **Make**: Minimize Waste, Maximize Efficiency & Productivity; Quality
- **Sustain**: Minimize Costs & Inventory, Maximize Service Level & Value-add Services
- **End of Life**: Maximize Compliance

**Continuous Improvement**
Complexity Exceeds Capacity

- Decision-making is a multi-disciplinary collaborative process, inclusive of all stakeholders, throughout the product lifecycle
  - Spans communities of practice, geographies and enterprises
  - Multiple diverse technical and business disciplines and practices
  - Conflicting business and technology drivers

- Changing workforce demographics

- Fewer focal points for product-centric decisions
  - Multiple communities
  - Absence of a physical product
Time-Value of Information

Information and Context Clarity

Value and Impact

Time

Value

Time
Typical Engineering Environment Today (and tomorrow)

- CAD, CAD Everywhere
- And many others…
- Reducing efficiencies and collaboration
  - Need to translate / recreate / correct older designs in new CAD formats
  - Mandates to deliver designs in a client-dictated format
  - Specialized resources cannot be shared across projects
  - Users need to be trained on specific tools
A Matter of Trust

- Design challenges and simulation requirements demand increasingly sophisticated CAE / DM tools

- Participants, especially non-experts:
  - Skills and understanding gap (often exacerbated by low fidelity)
  - Low trust
  - Less efficient and effective collaboration
Visual Information Levels the Playing Field

- A natural and effective way to communicate across barriers and level the playing field for all participants
- Simplifies complex information
- Synthesizes multiple sources to a common (visual) representation
- Increases capacity [multiple knowledge workers] and fidelity [multiple perspectives] of decision making

Visual information closes the digital gap
Leading Manufacturers...
The Case for Virtual Reality

- Accelerating ramp-up time at Ford Europe
- Capturing and validating the voice of the customer at Daimler Benz
- Visual design verification as a formal stage gate at Daimler & BMW

Source: IC:IDO, Safeworks, Dassault Systemes
Repurposing Visual Information

- Siemens Power Generation uses CAD and virtual reality tools as sales aids

Source: Siemens Power Systems
Sharing Too Much?

- Embedded digital rights management
- Protecting visual information
  - Remove dimensioning and tolerances
  - Reduce accuracy
  - Tessellated skin models
  - Hide or distort key features

Source: Deere & Co.
Simulation in Second Life

- Progressive Insurance’s virtual service center
  - Avatars handling difficult situations
    - "Traumatized Claimant"
    - "Cancellation of Policy Threats"

- Mercedes Benz’ second life showroom and racetrack
  - Brand promotion
  - Voice of the customer
From Digital Back to Physical?

- Augmenting digital tools with physical objects
- Adding fidelity and confidence to decisions

“Everyone would like to say that everything can be done on the computer. It can’t. We did have some interference with the instrument panel we didn’t expect…. We all kind of scratched our heads and said ‘How did that happen?’”

Andrew Farah, Chief Engineer GM Volt

Source: Objet
Leading Manufacturers

Visual information to enhance the **fidelity and certainty** of decisions
- Broaden the circle of decision makers
- Unify design and business information
- Improve understanding and effective participation

- **Focus on early design phases, but do not ignore downstream**
  - Opportunities in interdisciplinary and organizational boundary-crossing scenarios
    - E.g. Voice of the Customer, Design for X (manufacturability, service, environment, etc.)

Open collaboration environment
- Open systems
  - Interoperable standards
  - Persist and disseminate product knowledge
On Open Standards

IT Spend as % of Revenue

<table>
<thead>
<tr>
<th>Business Focus</th>
<th>IT Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6%</td>
<td>3.2%</td>
</tr>
<tr>
<td>3.1%</td>
<td>2.8%</td>
</tr>
</tbody>
</table>

Source: IDC Manufacturing Insight
Learn More

- Visual Decision–Making: Visual Information for Effective Collaboration in Product Lifecycle Management (PowerPoint Presentation)
- The CEO's Dilemma - How to drive efficient innovation in the organization (PowerPoint Presentation)

@jbarkai@idc.com