9TH INTERNATIONAL DSM CONFERENCE

From Product/Service Complexity Management to Innovation

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IN COOPERATION WITH BMW GROUP
CAPITALIZE ON COMPLEXITY

Outline

- What is DSM?
- Applications of DSM
- DSM alternatives
- Data mining in DSM
  - Modularity
  - Mass customization
  - Innovation
- Data-driven innovation
- Conclusion

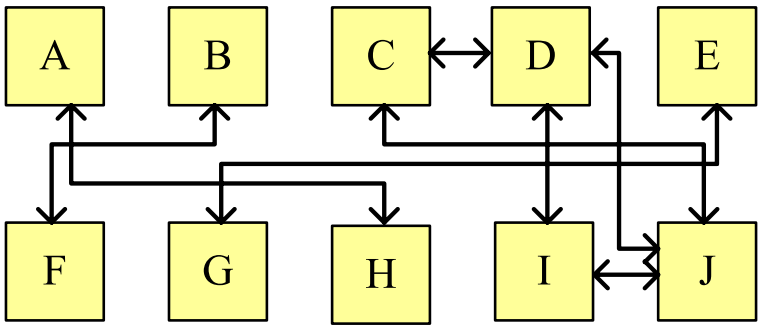
What is DSM About?

1. Simplification
2. Better understanding
3. Improved organization
4. Complexity reduction
5. …

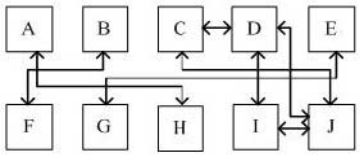
Modularity: Products and Services

Product with 10 components labeled A though J

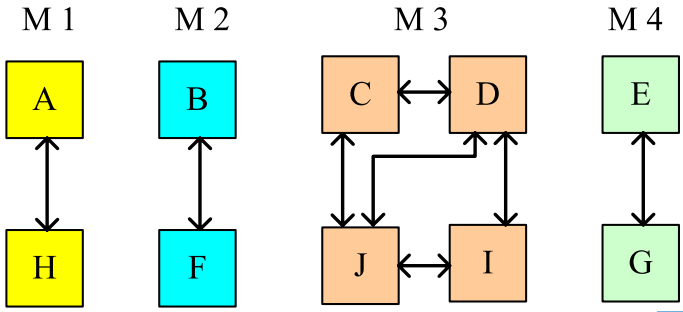
Example



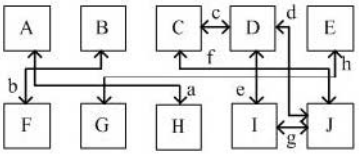
Module Representation



	A	H	B	F	C	D	I	J	E	G	
A	A	*									M1
H	*	H									
B			B	*							M2
F			*	F							
C					C	*		*			M3
D					*	D	*	*			
I						*	I	*			
J					*	*	*	J			
E									E	*	M4
G									*	G	



Interface Structure Matrix



Advantage:
ERP (e.g., SAP)
derived data

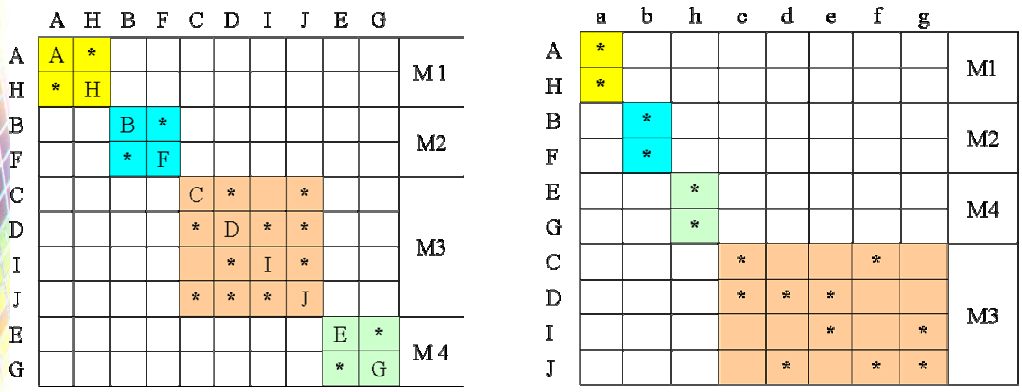
	a	b	c	d	e	f	g	h
A	*							
B		*						
C			*			*		
D			*	*	*			
E								*
F		*						
G								*
H	*							
I					*		*	
J				*		*	*	

DSM vs ISM

DSM Solution

Identical?

ISM Solution



Solving DSM and ISM

DSM

- Specialized algorithms published in the literature
- DSM software

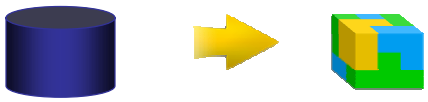
ISM

- General clustering algorithms
- Optimization software
- Data mining algorithms and software

What is Data Mining?

A process

- Domain understanding
- Data selection
- Preprocessing, e.g., integration of different files
- Data transformation
- Pattern (knowledge) discovery
- Interpretation (e.g., visualization)
- Reporting



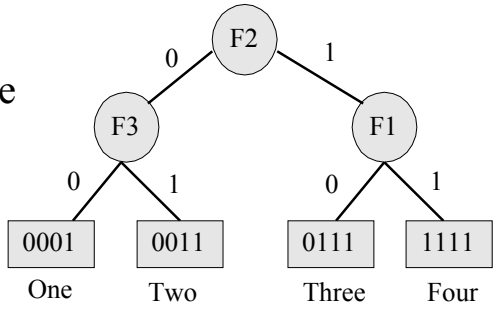
Knowledge

Decision Tree

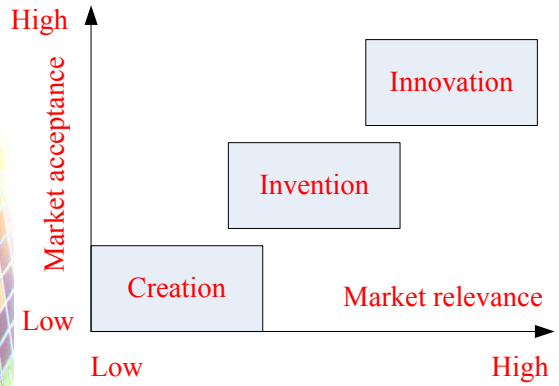
Pattern

F1	F2	F3	F4	D
0	0	0	1	One
0	0	1	1	Two
0	1	1	1	Three
1	1	1	1	Four

F1	F2	F3	F4	D
0	0	0	1	One
0	0	1	1	Two
0	1	1	1	Three
1	1	1	1	Four

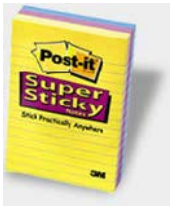


Innovation and Leading Innovators



- Apple Computers (Product/Service Design)
- IDEO (Product & Service Design)
- 3M (Product Development)
- Google (Software Innovation)

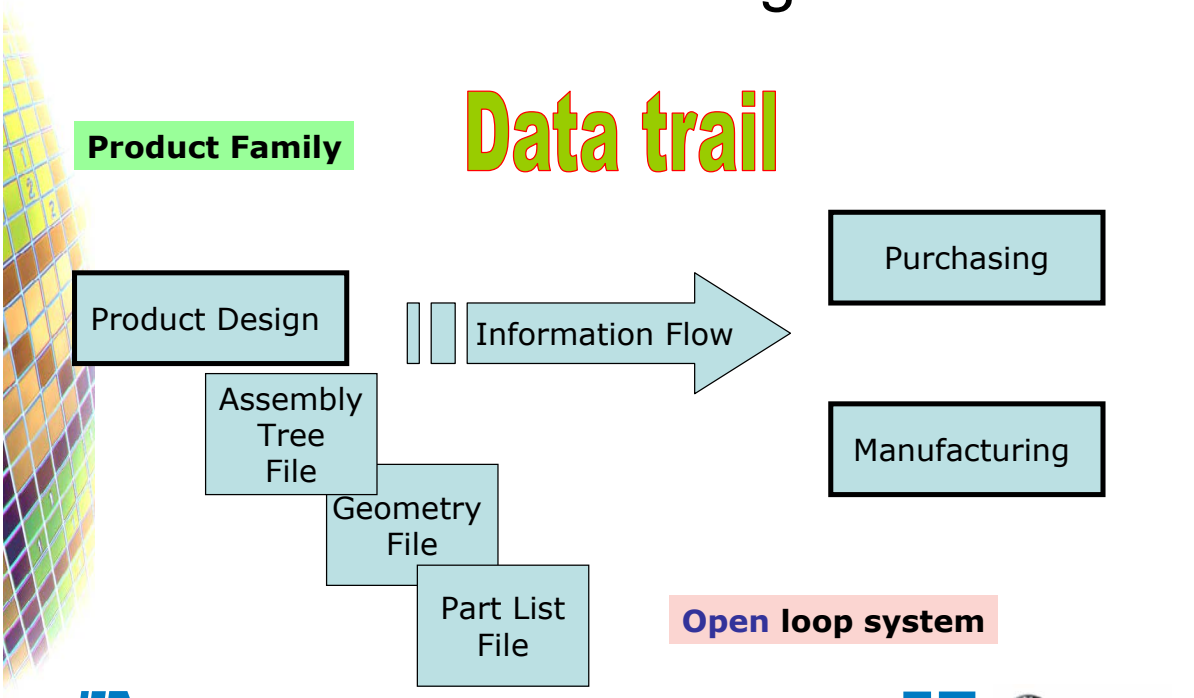




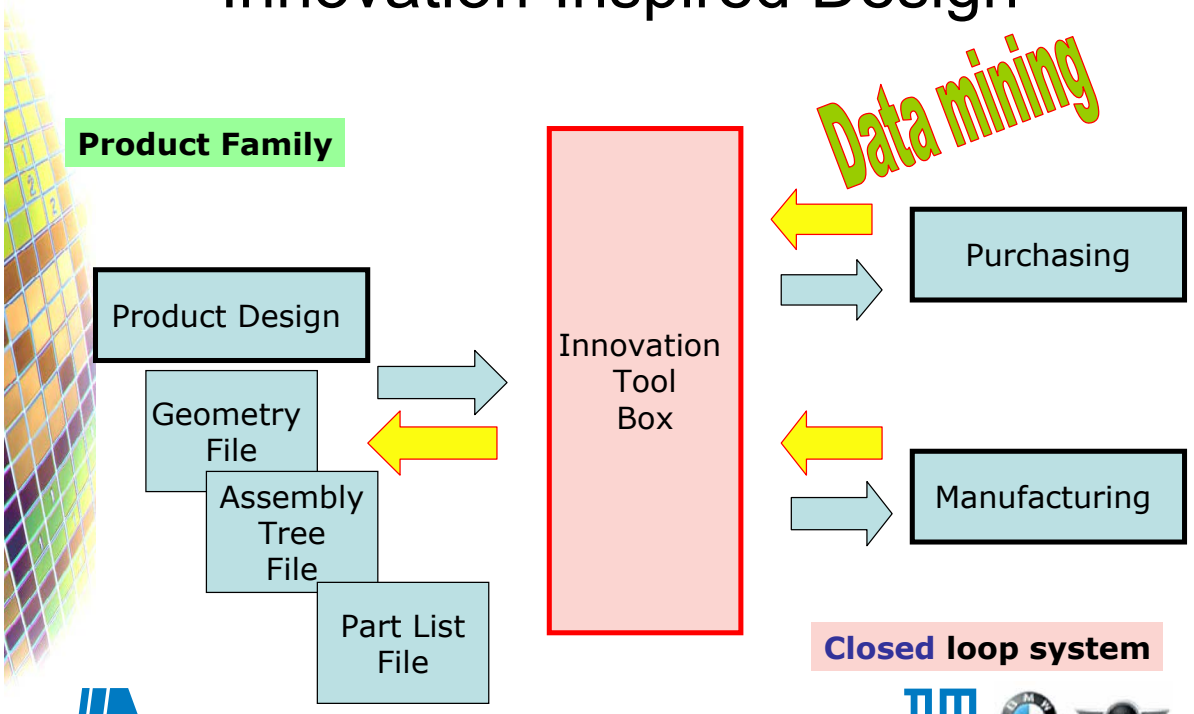
Data-driven Innovation

- Data reflect product/system behavior
- Data have been used to monitor, process, improve efficiency, detect faults, etc.
- The use of data in data in innovation has not been pursued
- Innovative ideas may be embedded in the data

Traditional Design



Innovation-Inspired Design



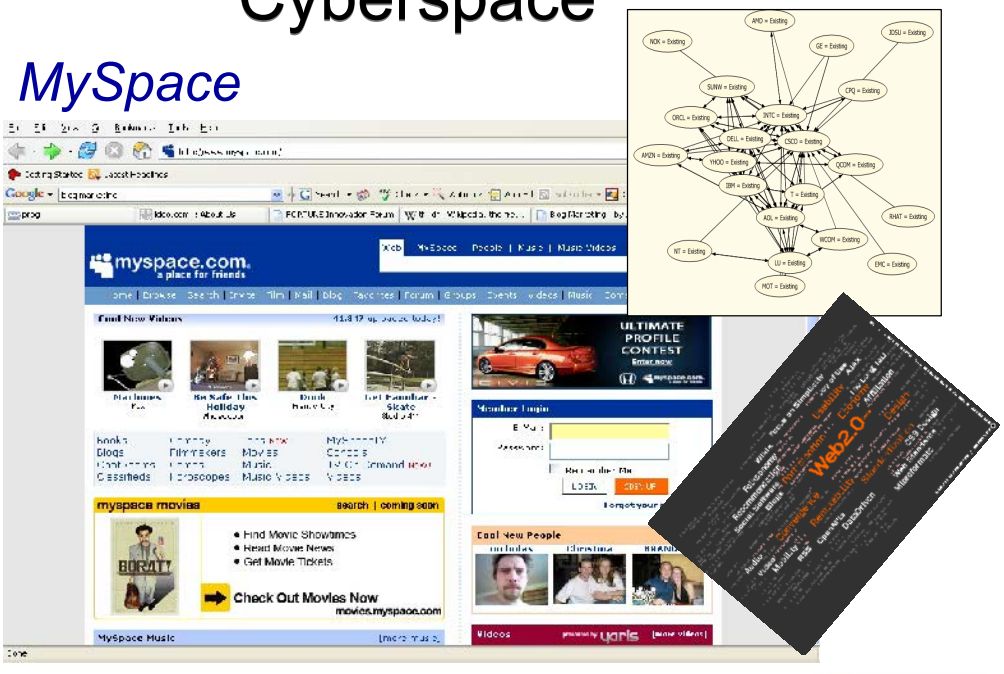
Innovation: Multi-dimensional Origin

- Customer induced
- Expert induced
- Product life-cycle induced
- Information-world induced

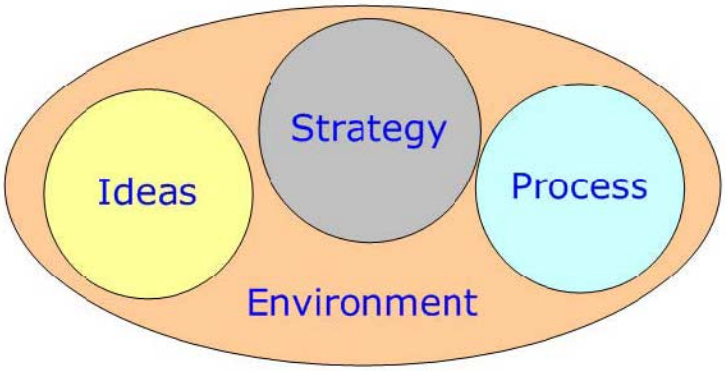
- Requirements driven

Cyberspace

MySpace

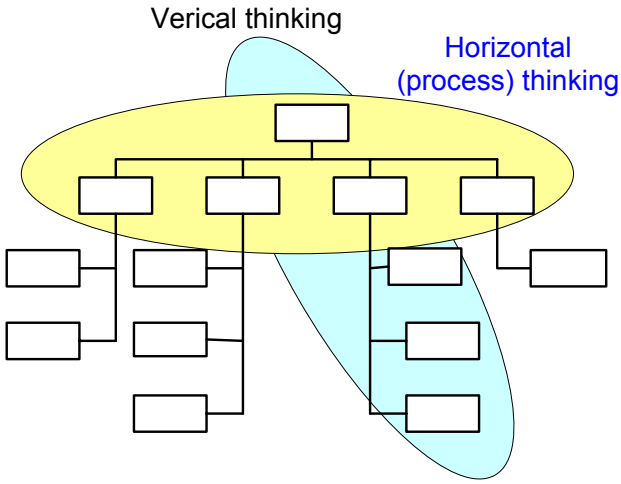


Innovation: What is Needed?



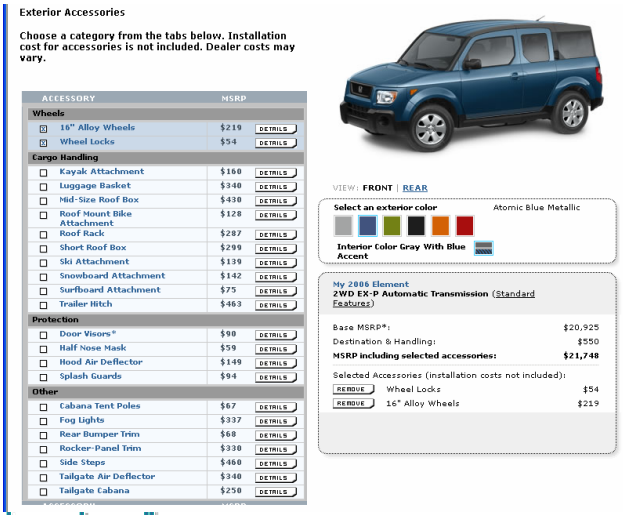
http://www.getfuturethink.com

Innovation: Process Thinking



Mass Customization

Honda Element



"Like its driver each Toyota Echo is unique"

Conclusion

- Wide spectrum of DSM applications
- Complexity reduction of products, systems, and services
- Data access and scalability
- Pattern discovery with DSM and data mining
- Coupling DSM with innovation
- No single "one-size fits all" innovation methodology on the horizon
- Diverse products, systems, and services call for different innovation approaches

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