2nd Workshop on Innovative Engineering for Fluid Power:
Applications in Aircraft, Vehicles and Energy (Wind, Hydroelectricity and Oil & Gas)

The importance of Marketing &Sales for Innovation in H&P Industry

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Innovation in H&P Industry

Why opening a workshop on Innovative **Engineering** talking about **Marketing&Sales**?

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What is Fluid Power?

Technology of using fluid, either liquid (hydraulic) or gas (pneumatics), to transfer power and energy to create motion

Fluid Power Applications

Aerospace

- Landing gear
- Brakes
- Flight controls
- Motor controls
- Cargo loading equipment

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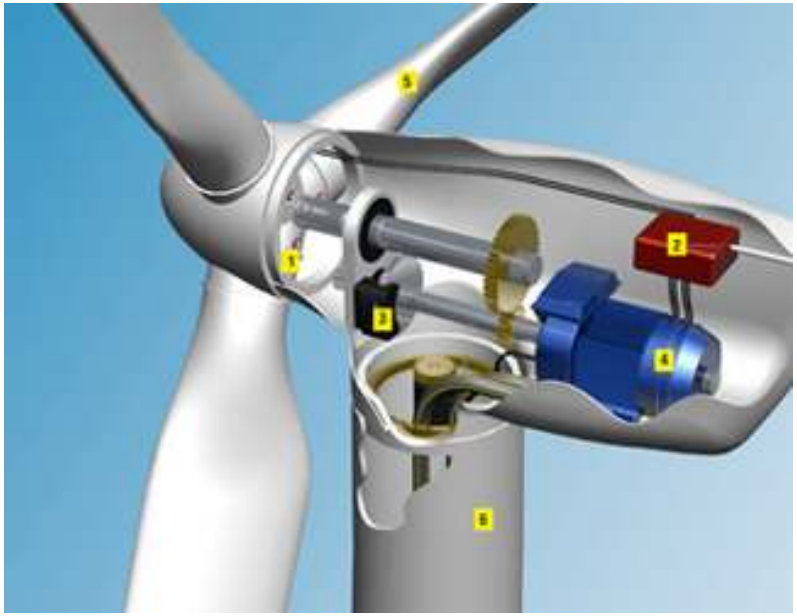
Fluid Power Applications



Energy

- Hydraulic wind turbine
- Lift systems for offshore oil platform
- Subsea hydraulic distribution system
- Hydraulic pumping systems for crude oil

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Fluid Power Applications

Industrial

- Metalworking equipment
- Controllers
- Automated manipulators
- Material handling
- Assembly equipment

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Fluid Power Applications

Mobile

- Backhoes
- Graders
- Tractors
- Truck brakes
- Suspensions
- Spreaders
- Highway maintenance vehicles

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Demands for Innovation in Fluid Power

Making fluid power compact, efficient and effective

- Compact means smaller and lighter for the same function
- Efficient means saving energy
- Effective means clean, quiet, safe and easy-to-use

Major goals

1. Doubling fuel efficiency in current applications
2. Expand fluid power use in transportation
3. Create portable, un-tethered human-scale fluid power applications
4. Ubiquity - fluid power that can be used anywhere

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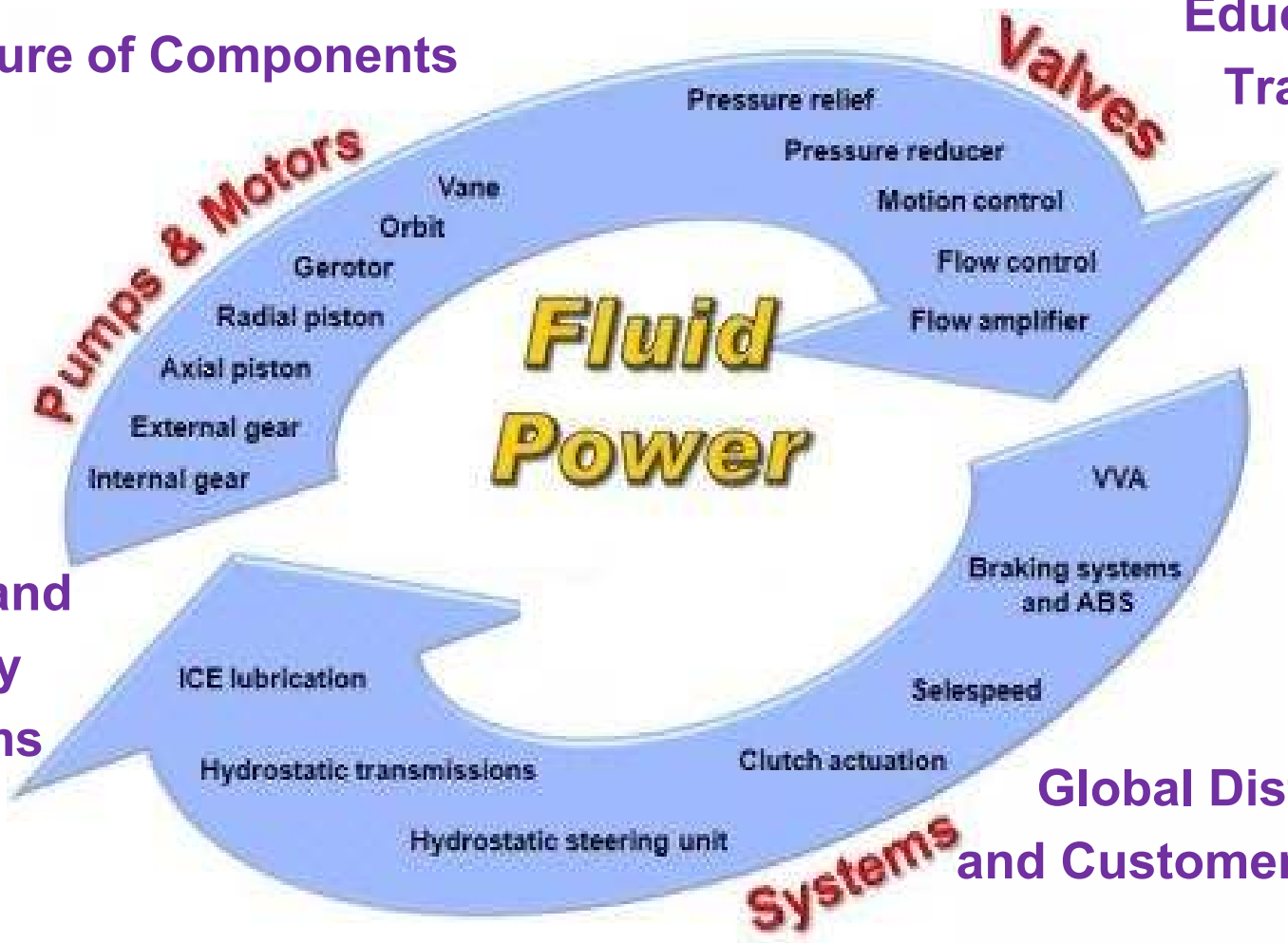
Source: Prof. Kim Stelson
Director, Center for Compact and Efficient Fluid Power , University of Minnesota

Fluid Power Industry Value Chain

Design and Manufacture of Components

Education and Training



Design and Assembly of Systems

Global Distribution and Customer Support

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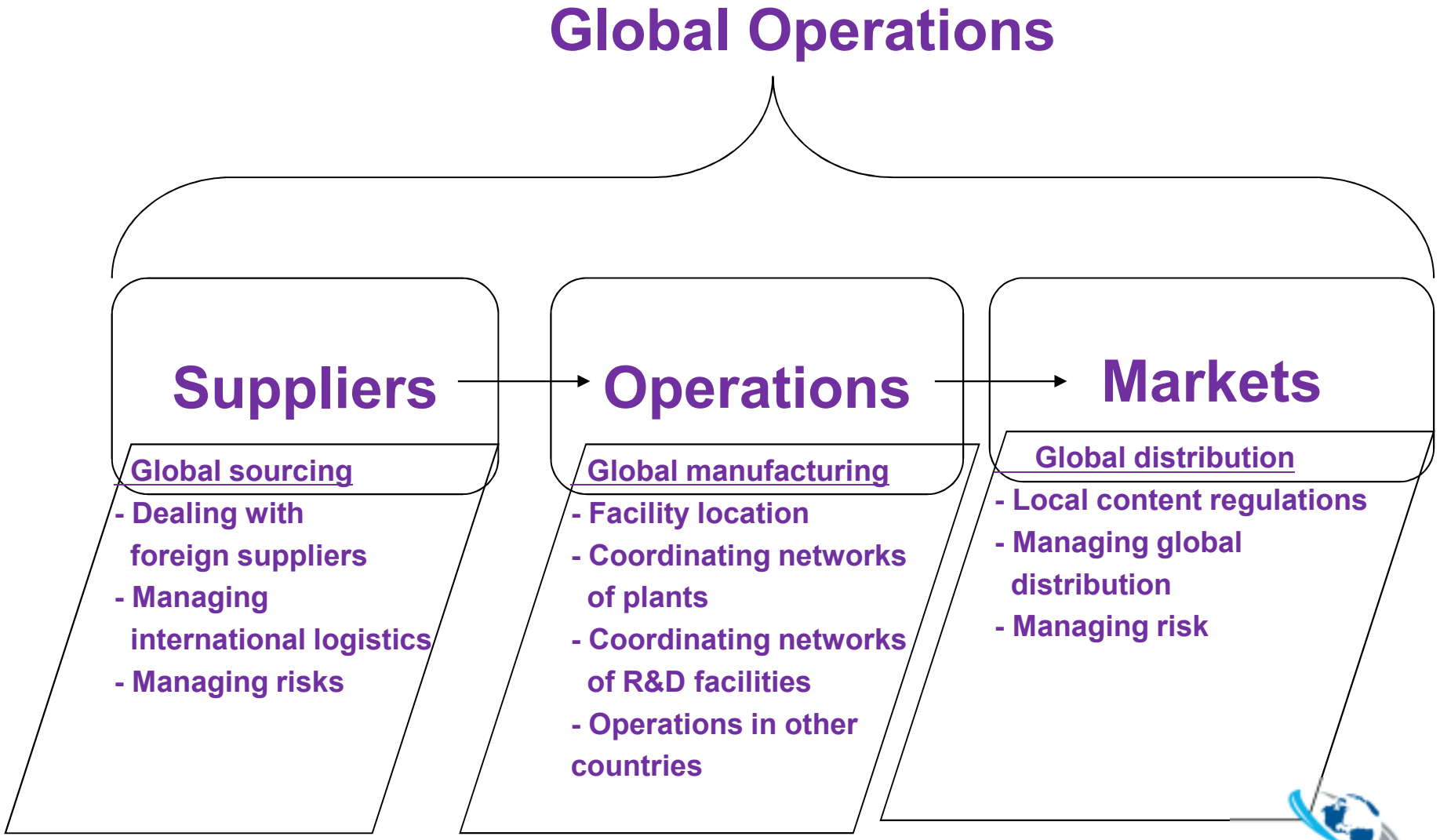
Fluid Power Industry Value Chain



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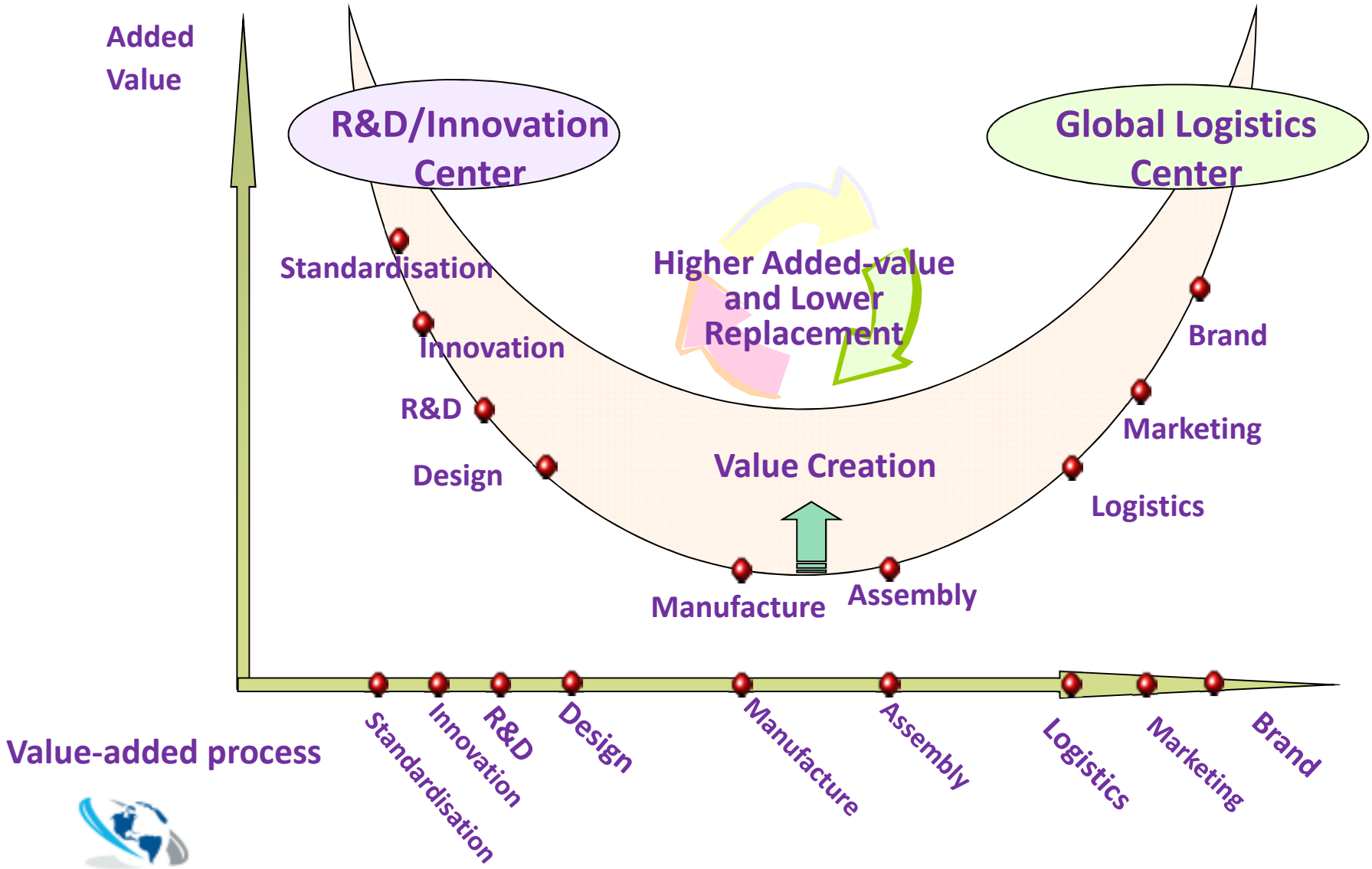
Smiling Face Curve



Source: Business Week International online extra, May 16, 2005, Stan Shih

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Challenges for Developing Global New Products

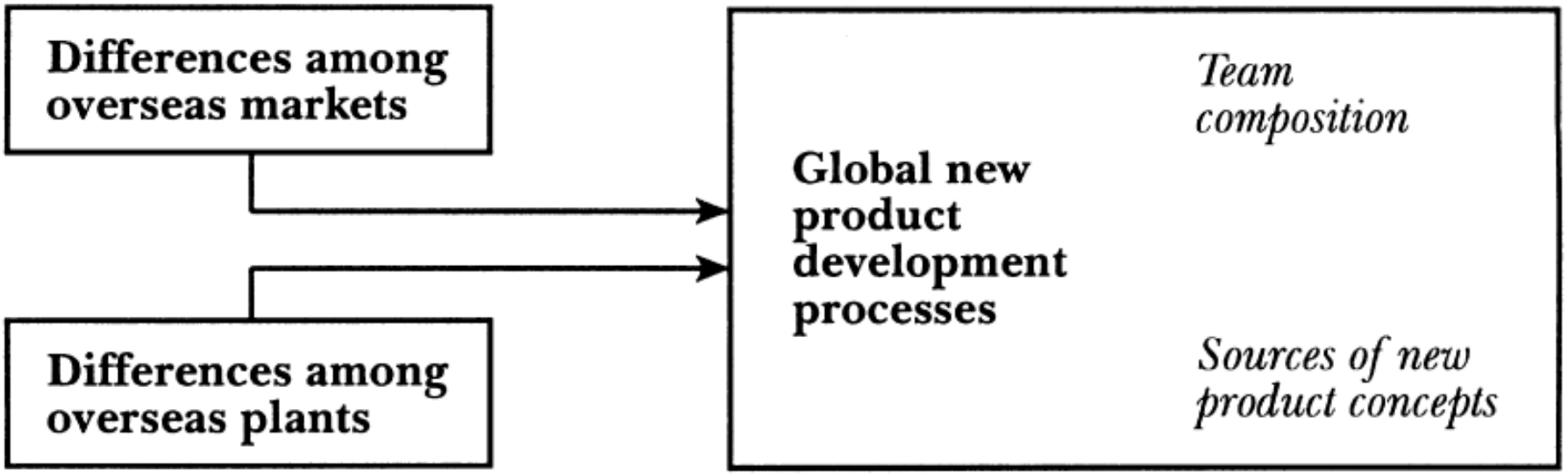

Figure 1. Emerging framework for global new product development processes

Source: Subramaniam, M., Rosenthal, S. R., & Hatten, K. J. (1998). Global new product development processes: Preliminary findings and research propositions. *Journal of Management Studies*, *35*(6), 773-796.

Routines for Global New Product Development: The Case of Hydraulic Excavators

Differences Among Overseas Markets
Lesson 1: Product Requirements

Consumer Preferences		
Explicit Attribute	Bucket size, reach	
Tacit Attribute	¨Rugged¨ Styling	Delicated and Finesse

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Source: Subramaniam, M., Rosenthal, S. R., & Hatten, K. J. (1998). Global new product development processes: Preliminary findings and research propositions. *Journal of Management Studies*, *35*(6), 773-796.

Routines for Global New Product Development: The Case of Hydraulic Excavators

'We [in hydraulic excavators] know what different markets want ... it is rationalization of these requirements which is a bigger deal ... For instance, different digging force requirements in the US and Japan create very different ramifications to the structure [of the equipment] and design. What we think of as design solutions may not be possible to manufacture in other plants ... their capabilities are different, suppliers are different ... you need experience in those plants to know the details.'

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Source: Subramaniam, M., Rosenthal, S. R., & Hatten, K. J. (1998). Global new product development processes: Preliminary findings and research propositions. *Journal of Management Studies*, *35*(6), 773-796.

Routines for Global New Product Development: The Case of Hydraulic Excavators

Differences Among Overseas Plants

Lesson 2: Manufacturability

Consumer Preferences

Explicit Attribute

Difference in digging force

Tacit Attribute

Several design choices

Manufacturing feasibility

Supplier capabilities

Complex-knowledge dependent on personal experience

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Source: Subramaniam, M., Rosenthal, S. R., & Hatten, K. J. (1998). Global new product development processes: Preliminary findings and research propositions. *Journal of Management Studies*, *35*(6), 773-796.

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Differences Among Overseas Plants

Lesson 3: Team Structure

Preferences

Composition

Cross-national

Included subsidiary managers as team members

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Source: Subramaniam, M., Rosenthal, S. R., & Hatten, K. J. (1998). Global new product development processes: Preliminary findings and research propositions. *Journal of Management Studies*, *35*(6), 773-796.

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Differences Among Overseas Plants

Lesson 4: Sources of New Product Concept

Preferences

Sources

Headquarters and overseas subsidiaries

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Source: Subramaniam, M., Rosenthal, S. R., & Hatten, K. J. (1998). Global new product development processes: Preliminary findings and research propositions. *Journal of Management Studies*, *35*(6), 773-796.

Conclusions

- ✓ Successful innovations have been the result of a tremendous team effort bringing both Engineering (explicit) and marketing (tacit) perspectives together;
- ✓ Proximity of marketing and engineering with university is essential to respond to innovation challenges in fluid power;
- ✓ The WIEFP is an example of how Brazilians can collaborate and contribute.

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