

Customer Involvement in Industrial Product Development: Creating Superior Products

First Paper by:
Jeffrey S. Pinegar
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Agenda

- Scope, Motivation and Research Questions
- Customer Involvement in Product Development (NPD)
- Customer Involvement Framework
 - Customer Involvement
 - Market Orientation
 - Relationship Marketing
 - NPD Success
 - Product Impact on the Customer (Customer Relevance)
- Future Research

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Scope

- Industrial New Product Development
 - Manufactured materials, parts and capital items purchased for further processing, or for use in conducting business
 - Excludes services
 - Excludes consumer products based on use
(Kotler & Armstrong, 1997)
- Commercialization of Technology
 - First Products are critical to the commercialization of technology
(Jolly, 1997; Moore, 1991)
- Customer ↔ Manufacturer Dyad
 - In the development of new products
 - Not individual customer's cognitive or affective approach to an existing product or product class

Motivation

- Over 10,000 new products are market every year in the United States alone (Crawford, 1997)
- Successful products are crucial to business success through the creation of sustainable competitive advantage (Porter, 1985)
- “A dominate success factor is having an unbeatable product: a superior product ...” (Cooper, 1998)

Motivation (cont.)

- * The customer is critical to product development
 - The customer is integral with many business strategies
 - Market-driven Strategy
 - Customer-focused Strategy (*Deshpande, 1999*)
 - Innovation and new product creation must meet the needs and satisfy the wants of the customer (*Cooper, 1998; Drucker, 1954; Wheelwright & Clark, 1995*)
- * Customer interaction afforded by the internet and e-commerce increase pressure for product mass customization (*Peppers, Rogers, & Dorf, 1999; Prahalad & Ramaswamy, 2000; Slywotzky, 2000*)

Motivation (cont.)

- * Other research suggests that customers can be risk-averse and not eager for new product innovations, thereby inhibiting the development process (*Souder 1987*)
- * Customers inhibit organization innovation and their ability to develop break through products (*Bennett & Cooper, 1979; Christensen & Bower, 1996; Hamel and Prahalad, 1994*)
- * The role of the customer in product development has generally been neglected. Some exceptions:
 - von Hippel's work on Lead-User-Analysis (*1976, 1984, 1988*)
 - Griffin & Hauser's work on the Voice of the Customer (*1993*)

Customer Led or Market Oriented

	Customer Led	Market Oriented
Strategic Orientation	Expressed Wants	Latent Needs
Adjustment Style	Responsive	Proactive
Time Horizon Focus	Short-Term	Long-Range
Objective	Customer Satisfaction	Customer Value
Learning Processes	Customer Survey Key Account Relationship Focus Groups Concept Testing	Customer Observation Lead user Relationships Continuous Experimentation Selective Partnering

Slater & Narver (1998)

Research Questions

- Is customer involvement always preferred?
- What are the antecedents to customer involvement?
- What should be the role of the customer new product development?
- How will the involvement of customer in new product development transform the process and the products?

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Customer Involvement in NPD

- Active engagement in the process of product development with the developing company
- An exchange between the potential customer and the people of the developing organization

	Interaction	Collaboration
Relationships	Transactions	Continuous
Structure	Formal	Informal
Dependency	Independent	Interdependent
Environment	Competitive	Cooperative
Mechanisms	Communication	Shared vision, collective goals
Metric	Cost per transaction	Opportunity gain

Customer Involvement is defined as:

the interaction and/or collaboration between channel members (including customers and users) and company personnel during the course of product development to actualize a commercial product.

Consumer Behavior – Involvement Theory History

- Split-Brain Theory (*Hansen, 1981*)
- Involvement Theory in Media (*Krugman, 1982*)
- Involvement Theory in Products and Purchases (*Schiffman and Kanuk, 2000*)
 - High and Low Involvement Customers
 - High and Low Involvement Purchases
 - Degree of Personal Relevance
 - High Involvement = Very Important
 - Low Involvement = Low Importance
- A cognitive and affective experience within the customer

Classification of Customer Roles

- NPD and technology commercialization may be characterized by the two dimensions of technology development and market development

(Leonard-Barton, Wilson, & Doyle, 1993; Moriarty & Kosnik, 1989)

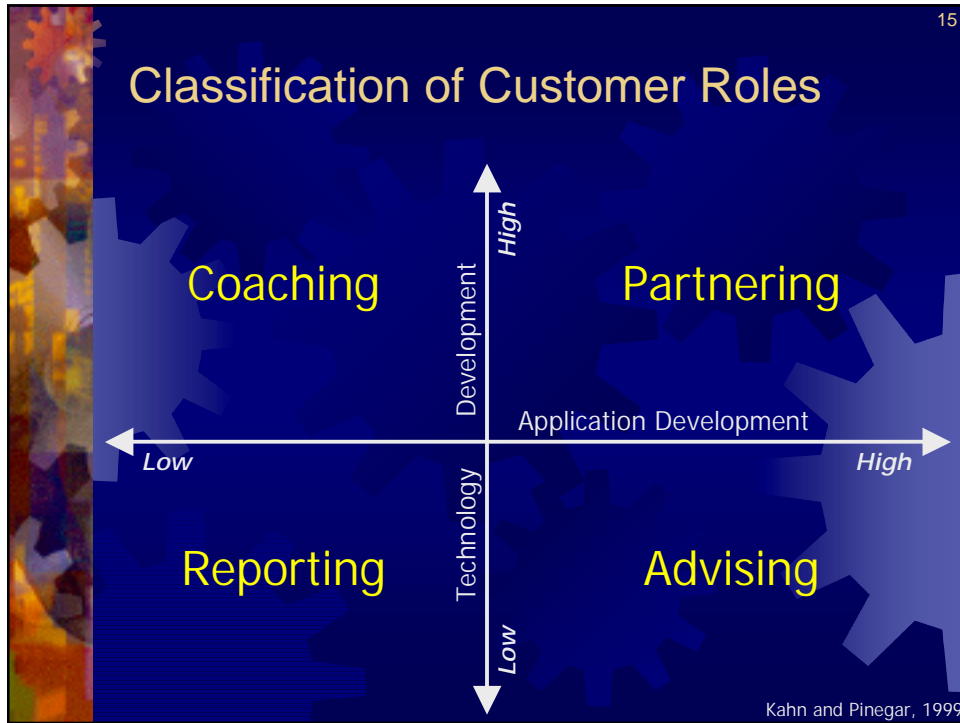
- Technology Development *(Jolly, 1997)*

- The invention of the capability

Classification of Customer Roles

- Market Development \Rightarrow Application Development

- Application requirements are a subset of market requirements that define the product
- Application requirements, when implemented, transforms the invented capabilities into a bundle of attributes desired by a particular market segment *(Crawford, 1997; Moore, 1991)*
- Application development is the process of defining requirements, refining technology and packaging technology in a form suitable for use in a particular context *(Clark & Wheelwright, 1993)*



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- ## Coaching
- Technology Forecasting
 - Brainstorming
 - Identification of Problems and Opportunities
 - Idea Generation
 - Prioritize
 - Review and Advise
 - Concept Definition
 - Funding

Partnering

- ☀ Evaluate Alternative Implementations
- ☀ Explore Possible Applications
- ☀ Co-Development
 - Engineers/Scientist
 - Other Resources
- ☀ Prototype Testing

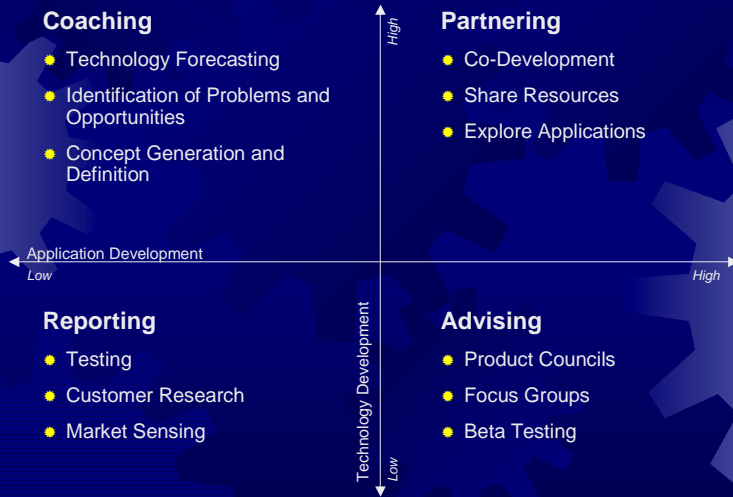
Advising

- ☀ Product Councils
 - Monitor Trends, Competitors
 - Identify Problems & Opportunities
 - Commercial Matters
 - Strategic Plans
- ☀ Focus Groups
 - New Application
 - Line Extensions
- ☀ Usability Testing

Reporting

- Testing
 - Beta Testing of Augmentations
 - Usability Tests
- Customer Research
 - Customer Visits
 - Focus Groups
 - Choice Models
 - Surveys

Classification of Customer Roles



Kahn & Pinegar, 1999

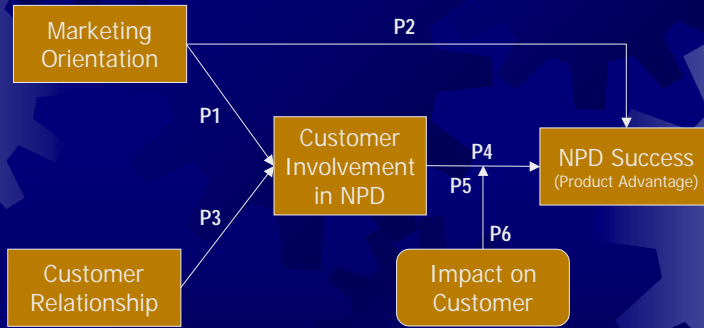
	Coaching	Partnering	Advising	Reporting
<i>Type of Innovation</i>	<i>Discontinuous Innovation</i>		<i>Incremental Innovation</i>	
<i>OEM Commercialization Focus</i>	<ul style="list-style-type: none"> Conceive Plan 	<ul style="list-style-type: none"> Development Prototyping Launch 	<ul style="list-style-type: none"> Market Acceptance Market growth 	<ul style="list-style-type: none"> Maintenance Market Expansion
<i>OEM Offering to the Customer</i>	<ul style="list-style-type: none"> Learning Forum 	<ul style="list-style-type: none"> Technology Form Expertise 	<ul style="list-style-type: none"> Key Access to OEM 	<ul style="list-style-type: none"> Responsiveness to Customer Feedback
<i>OEM's Motivation to Involve Customers</i>	<ul style="list-style-type: none"> Opportunity Identification Idea Generation Clarity of Problem Definition 	<ul style="list-style-type: none"> Product Integrity Technology Application Fusion Establish a Beachhead 	<ul style="list-style-type: none"> Complete Product Platform Market Expansion Strengthen Channel Presence 	<ul style="list-style-type: none"> Market Sensing Product Fine Tuning
<i>Customer Participants</i>	<ul style="list-style-type: none"> Key Experts Opinion Leaders Technology Enthusiasts 	<ul style="list-style-type: none"> Lead Users Visionaries 	<ul style="list-style-type: none"> Early Majority Customers Channel Partners 	<ul style="list-style-type: none"> Customers Non-customers
<i>Customer Offering to the OEM</i>	<ul style="list-style-type: none"> Technology Forecasting, Seeding of Ideas 	<ul style="list-style-type: none"> Technology Application Expertise 	<ul style="list-style-type: none"> Direction 	<ul style="list-style-type: none"> Feedback
<i>Customer's Motivation to Work with OEM</i>	<ul style="list-style-type: none"> Learning Opportunity Affiliation with OEM Curiosity 	<ul style="list-style-type: none"> Competitive Advantage Dramatic Performance Increase Technology Application Exclusivity 	<ul style="list-style-type: none"> Influence Direction of OEM Increase Customer Value Augment/Complete Solution Expand Solution Opportunities 	<ul style="list-style-type: none"> Ability to Voice Opinion Product Enhancements
<i>Collective Activities Between OEM and Customer</i>	<ul style="list-style-type: none"> Technology Forecasting Identification of Problems and Opportunities Concept Generation and Definition 	<ul style="list-style-type: none"> Evaluate Implementation Choices Explore Possible Applications Co-Development Joint Problem Solving Shared resources Prototype Testing 	<ul style="list-style-type: none"> Product Councils Problem/Opportunity Identification Beta Testing 	<ul style="list-style-type: none"> Market Testing Customer Research
<i>Challenges Facing the OEM-Customer Relationship</i>	<ul style="list-style-type: none"> Scope Creep Privacy 	<ul style="list-style-type: none"> Complexity of Relationship Relationship Commitments Intellectual Property Rights "Not Invented Here" Attitude Finding the Right Partner 	<ul style="list-style-type: none"> Multiple Firm Dynamics Group Think Impact vs. Value 	<ul style="list-style-type: none"> Overconfidence Apathy Biased Opinions

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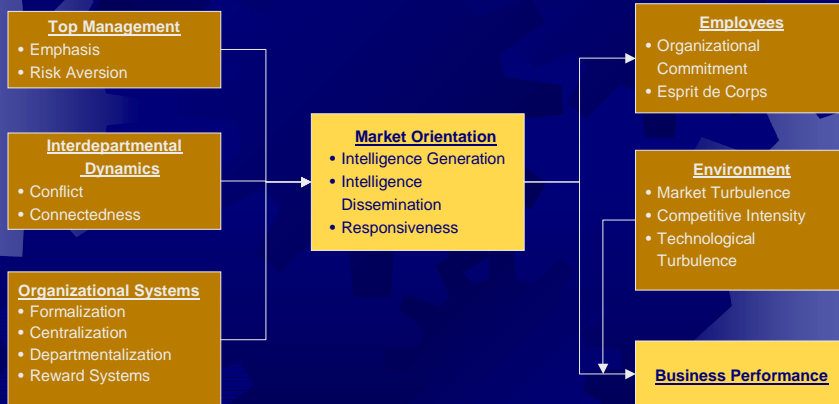
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Customer Involvement Framework



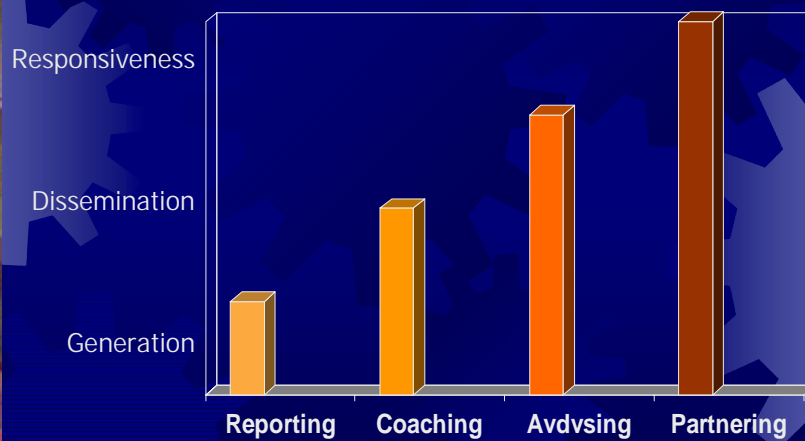
Market Orientation



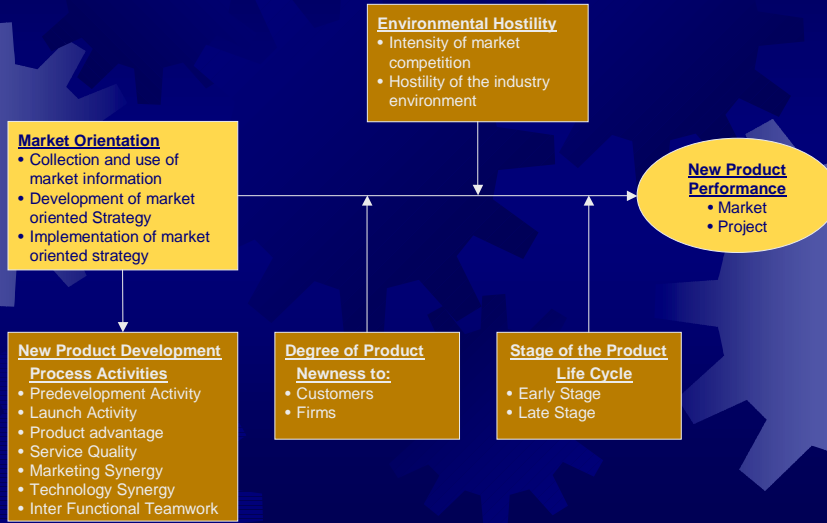
Market Orientation and Customer Involvement

- Market intelligence generation is enhanced through customer involvement
- Market intelligence dissemination is facilitated with interaction and collaboration with customers
- Market responsiveness is for the benefit of the customer

Market Orientation

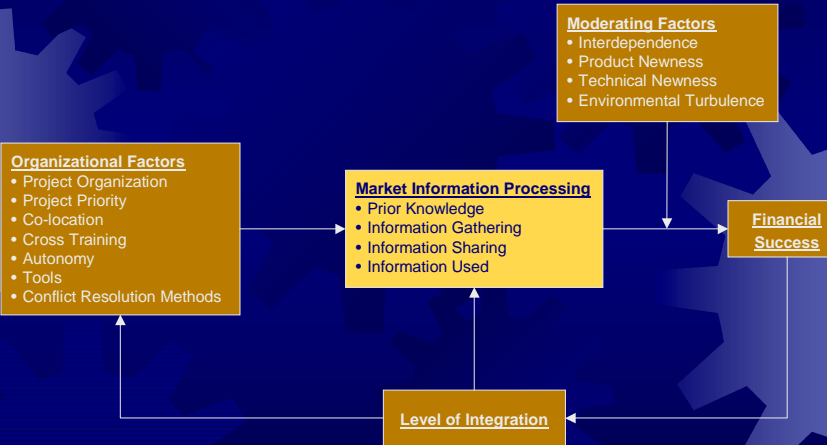


NPD and Market Orientation



Atuahene-Gima, 1995

NPD and Market Orientation



Ottum & Moore, 1997

P1: A market orientation will encourage firms to involve customers in their product development efforts.

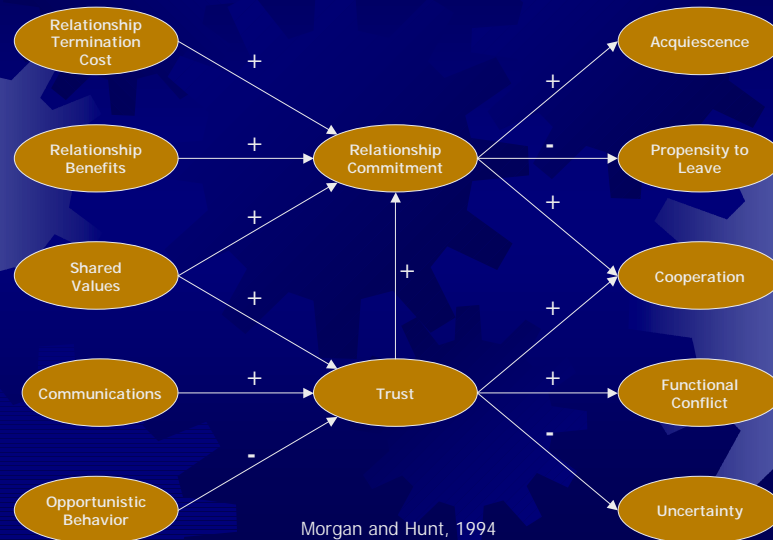
P1a: A market orientation will encourage firms to involve customers in their product development efforts, regardless of the degree of technology development.

P1b: A market orientation will encourage firms to involve customers in their product development efforts, regardless of the degree of application development.

P2: A market orientation has a direct effect on the success of a firm's new products.

P2a: A market orientation will promote the development of products that have a strong competitive advantage.

Commitment-Trust Theory



Customer Relationship and Customer Involvement

- Customer involvement in the new product development constitutes a relationship between the manufacturer and the customer
- Lacking trust firms will not engage customers in their new product development
- Lacking commitment firms will not overcome the challenges of customer involvement
- Without commitment and trust cooperation is impossible

P3: A customer relationship enables a firm to involve that customer in their product development efforts.

P3a: A relationship with a customer enables coaching activities.

P3b: A relationship with a customer enables partnering activities.

P3c: A relationship with a customer enables advising activities.

P3d: A relationship with a customer enables reporting activities.

New Product Development Success

- Prior to 1993 there were 61 research studies and 77 articles published on the subject of success and failure (*Griffin & Page 1996*)
- One of six critical success factors in a NPD is the inclusion of the voice of the customer *throughout* development (*Cooper, 1998*)
- Nearly every study of success indicates that understanding customer needs and wants is at the heart of successful NPD

New Product Development Success

- * Success has been measured along three dimensions
 (*Griffin and Page, 1996*)
 - Customer-based success
 - Financial-based success
 - Technical Performance success
- * Performance measured along the three dimensions
 shifts with time (*Hultink, 1995*)
 - Short-term focus is often on technical performance
 - Long-term focus shifts toward customer and financial

New Product Development Success

- * Success and failure factors also seem to fall into two
 categories:
 - doing the right things and
 - doing those things right.

Author Study	Success or Failure Factor	Right Thing	Done Right
Griffin	Customer-Based	✓	
	Financial-Based		✓
	Technical or Process based		✓
Crawford	There was no need or want	✓	
Rothwell	The product did not meet the existing need		✓
	The product was not marketed well		✓

New Product Development Success

Author Study	Success or Failure Factor	Right Thing	Done Right
Cooper	Inefficient development		✓
Rothwell	NIH attitude		✓
	Lack of Senior Management involvement		✓
	Strategic alignment		✓
	Can not articulate customer needs		✓
	Compliance issues (minimum requirements)	✓	
	Competitive Analysis (what customers are buying)	✓	
	Product Positioning (what customer buys)	✓	
	Project Priority		✓
	Risk Management		✓
	Marketing Channel (where customer buys)	✓	
	Management Leadership		✓
	Resource commitment		✓
	Dependency Management		✓

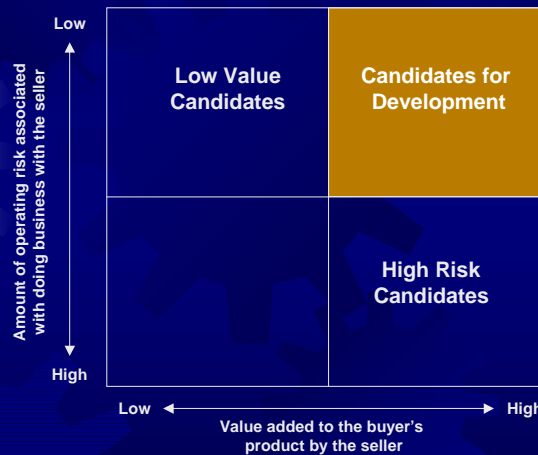
New Product Development Success

- ✦ The appropriate measure of success in the context customer involvement during development should focus those success and failure factors that the customer can influence during development
 - Product fit with market

P4: Customer involvement in product development will improve NPD success.

- P4a: Customer involvement in product development will lead to the development of higher quality products relative to competitive products.
- P4b: Customer involvement in product development will lead to the development of products with superior functional attributes relative to competitive products.
- P4c: Customer involvement in product development will lead to the development of products with a superior cost-benefit ratio relative to competitive products.

Product Impact on the Customer



Source: An integrated model of buyer-seller relationships – David T. Wilson, 1995

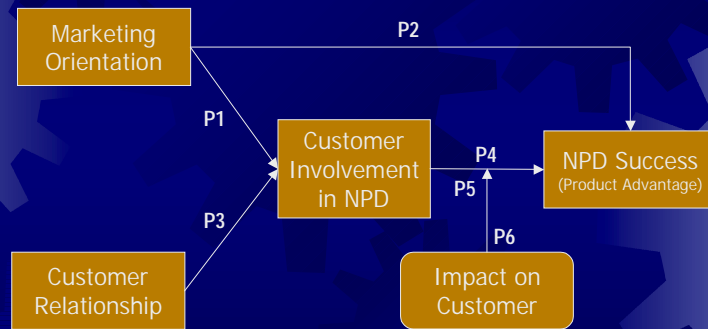
P5: Customer involvement in product development will generally occur in areas of high-impact.

P5a: Customer involvement in product development will generally occur in areas where the value added to the buyer's product by the seller is high.

P5b: Customer involvement in product development will generally occur in areas where the amount of operating risk associated with doing business with the seller is low.

P6: Perceived product impact on the customer will moderate the relationship between customer involvement and new product development success, with customer involvement being more important at higher levels of perceived impact.

Customer Involvement Framework



Future Research

- Further develop the framework for customer involvement in new product development
- Develop a model and hypothesis for empirical evaluation

Potential Managerial Implications

- The role of customer is not constant.
- Possibly Identify Best Practices for Customer Involvement in the Technology Commercialization Process
- Different customer roles present varying degrees of relationship complexity.
- In the case of business-to-business technology commercialization, technology life cycle and product importance influence the role of the customer.