

# *Findings of Research Study*

## Creating Lasting Values in Supply Chain Collaboration

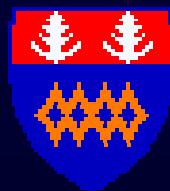
DRAFT

Synthesis of CLV Studies at Intel & P&G



January 29, 2002

v7



# Supply Chain Integration

<i>Dimension</i>	<i>Exchanges</i>	<i>How</i>
Information integration	Information, knowledge	Information sharing, collaborative planning, forecasting & replenishment
Coordination	Decisions, Work	Decision delegation, VMI, work re-alignment
Organizational linkage	Accountability, risks/costs/gains	Extended communication & performance measures, incentive realignment

# Objectives

Provide feedback to participants on the status of SC collaboration at their firm

Help participants develop consistent, productive, and long lasting (when desired) SC relationships

Help participants avoid pitfalls that lead to friction and misunderstandings

# Background

## Supply chain integration

- Considered a key element of competitiveness in a fast moving complex global market
- Requires close collaboration among supply chain parties

## Collaboration

- A well-accepted concept
- Unclear how successful companies have been in developing mutually beneficial and sustainable relationships

# Deliverables

- ✦ A set of guiding principles for creating successful collaborative relationships
- ✦ A vision of the ideal end state of relationships and results of that success
- ✦ Definitions of success
- ✦ Documented presentation (written & oral) with case examples

# Common Research Approach

- Interviews
  - Suppliers, Contract Manufacturers (Intel) and 3PLs (P&G)
  - Customers
  - Company Representatives
- Literature Research
  - Articles
  - Corporate websites

# Questions Asked



Information Integration

Coordination

Organizational Linkage

# Common Questions Asked

## Information Integration

- Type of information shared
- Frequency
- Granularity
- Visibility across multiple tiers
- Incentive schemes
- IT systems

## Coordination

- VMI Initiatives
- CPFR initiatives
- Collaborative Design
- Other efforts
- Coordination Media
- Incentive schemes
- IT systems

## Organizational Linkage

- Communication channels
- Performance measurements
- Assessment
- Contract terms
- Risk sharing



# Interview Targets – Stanford

- Suppliers to Intel
  - Independent suppliers
  - Contract manufacturers
- Customers of Intel
- Intel Representatives
  - For supplier and customer relationships
  - Strategic programs and e-business initiatives

# Interview Targets – MIT

- Suppliers to P&G
  - Suppliers of raw materials & services (3rd Party Logistics & Contract Mfrs)
- Customers of P&G
  - Grocery & Mass Merchandise Channels
- P&G Representatives
  - For supplier and customer relationships
  - Strategic relationship management and key collaboration initiatives

# Interviews Completed – Stanford

- 6 Suppliers of Intel:
  - TEL
  - Ividen
  - Shinko
  - Compeq
  - Sumitomo (Sitix)
  - Wacker
- 2 Contract Manufacturers
  - Jabil
  - Solectron
- 1 Customer
  - Dell
- 9 Intel representatives

Total of 18 interviews

# Interviews Completed – MIT

- 7 P&G Suppliers Overall
  - 3 Raw Material Suppliers
    - 3M
    - Cebal
    - Shell
  - 2 Contract Manufacturers
    - Chesapeake
    - Triplefin
  - 2 Service Providers
    - Packtion
    - Schneider National
- 5 P&G Customers Overall
  - 2 Grocery Chains
    - Hannaford Bros.
    - Safeway UK
  - 3 Mass Merchandisers
    - Kmart
    - Target
    - Wal-Mart

Total 36 interviews, 40 People

# Interviews Completed – Total

- 13 Suppliers Overall
  - 9 Raw Material & Capital Equipmt Suppliers
  - 4 Contract Manufacturers
  - 2 Service Providers
- 6 Customers Overall
  - 2 Mass Merchandisers
  - 3 Grocery Chain
  - 1 Direct

Total 54 interviews

# Bullwhip is Alive – Intel

Information currently shared with suppliers	Short term and long term forecasts	All suppliers interviewed
Means and frequency of sharing	Frequent, EDI, emails, spreadsheets	Only 1 using internet (Compeq)
Information desired by suppliers	Actual demand, inventory, forecast of tool/equipment	All desired more sharing & collaboration

# Bullwhip is Alive for RM Suppliers

## Limited Bullwhip for 3Ps – P&G

Information now shared with suppliers	Forecasts by SKU, Business plans, Historical data	In context of long term bus. plan in meetings
Means and frequency of sharing	Email (weekly, monthly), Meetings (monthly, quarterly)	Almost all use email; future to use web tools
Information desired by suppliers	Actual demand, production plans	RM suppliers desire actuals, 3Ps get actuals (more satisfied)

## Information Integration Observations – Intel

- ☀ Information sharing mostly manual, with no workflow integration with ERPs.
- ☀ Information sharing is asymmetrical, with suppliers sharing a great deal more – capacity, yield, lead time, inventory, shipping plans, forecasts, commitments – with Intel.
- ☀ No visibility beyond 1<sup>st</sup> tier suppliers.
- ☀ Most internet-savvy – Compeq – also rated Intel highest as a supply chain partner.



## Information Integration Observations – P&G

- ✱ Daily information sharing mostly electronic (EDI, email, some through portals), limited integration with ERPs, some web-based integration planned
- ✱ Mid- and long-term information sharing done in monthly meetings and annual senior mgt meeting
  - ‘Collaborative planning’ via meetings
- ✱ Information sharing appears balanced, although both parties require some different data
- ✱ No data sharing beyond 1<sup>st</sup> tier suppliers
- ✱ P&G planning supplier portal although not consistently across all SBUs

# Information Integration

## – Synthesis of Intel & P&G Cases Observations (A)

- ✿ Raw material suppliers share similar experience
  - Desire for more actual demand data
  - Potentially useful to invest time to jointly identify information needs
    - Frequency, horizon, granularity, media, interpretation process
- ✿ Third party (3P) providers are more informed
  - Direct or more direct access to actual demand vs. RM suppliers
- ✿ ‘Collaborative planning’ occurring in periodic face-to-face, business planning and vision sharing meetings at P&G
  - Multiple benefits to both parties
    - Create a common understanding of the data
    - Puts information in context of customer’s long-term plans and supplier’s capabilities
    - Instills a long-term systems perspective rather than transaction-only view
  - Does fast clockspeed of PC industry prevent or make it difficult for Intel to supplement data feeds with ‘collaborative planning’ meetings?  
(ASSUMPTION THAT Intel does not hold these meetings)

## Information Integration

### – Synthesis of Intel & P&G Cases Observations (B)

- ✦ Consistent but limited use of high-technology for sharing data
  - High use of electronic media but majority not automated or web-based
    - Use of portals in planning stages but not apparently progressive
  - Is this information sharing no-mans-land, in-between human-managed information sharing and machine-managed fully automated information sharing and use?
    - Automated data transfer (between firms) does not guarantee automated use, nor does it guarantee informed use
    - One way to get around that is using electronic methods for sharing information between firms and using meetings to interpret the data and put in proper context

# Knowledge Exchange – Intel

- ✿ Most valued more information sharing by Intel.
- ✿ Suppliers valued knowledge transfer from Intel – latest technology, world class requirements, technology plans.
- ✿ Suppliers valued collaborations with Intel on cycle time reduction, yield improvements, value engineering, joint cost saving projects, etc. (Compeq, Sitix Silicon Inc, Wacker).
- ✿ Collaborative design also valued (Sitix).

# Knowledge Exchange – P&G

- ✱ Both P&G and other parties valued information shared with them.
- ✱ Significant value delivered through knowledge sharing in peripheral areas – technology, legal, policy (environmental policy, manufacturing workforce policies such as high-commitment work systems)
  - Some customers and many suppliers depend on P&G for data analysis
  - Previously an in-house skill, now ‘outsourced’ to P&G but not paid for directly
- ✱ Customers valued knowledge transfer from P&G to improve their operations (SLOG) but felt pressure to adopt
- ✱ Customers valued collaboration with P&G on improving shelf-availability, process improvements

# Knowledge Exchange

## – Synthesis of Intel & P&G Cases Observations

- ✱ Useful knowledge transfer varied somewhat
  - Intel & P&G suppliers valued operations-related knowledge transfer (technology, cycle time reduction, yield improvements, value engineering, joint cost saving projects, collaborative design)
  - P&G & P&G's customers valued non-operations-related knowledge transfer (legal, environmental, HRM, technology)
- ✱ Knowledge transfer evolved into outsourcing knowledge use ... and a delivered service
  - P&G customers depend on P&G to problem-solve operational issues not always related to core P&G activities
  - Some P&G customers depend on P&G to conduct analyses of its data and operations (previously conducted in-house)
  - P&G and P&G customers do not pay for these additional 'services' and these are 'valued' differently by different communities at the customer (commercial, technical, operations, marketing)

# Coordination – Intel

*Form*

*Examples*

Evolving towards VMI	Sitix, Wacker
VMI with consignment & Intel-controlled DOI	TEL in Ireland
No coordination	Shinko, Ibsen

# Coordination Observations – Intel

- ✱ Various forms of VMI (or lack of) exist.
- ✱ Suppliers expressed concerns of Intel-specified DOI levels, as all risks rest with suppliers under consignment arrangement.
- ✱ Stringent inventory stocking requirements everywhere less efficient than allowing suppliers to use Intel's information to central stock and manage inventory replenishment (TEL).
- ✱ No CPFR or other collaborative planning efforts ongoing.
- ✱ Forecast revisions created tremendous nervousness, but suppliers were expected to meet any upside requests.



# Coordination Observations – P&G

- ✿ Varying degrees of coordination, most fairly high
  - Many evolving towards enlightened collaboration
    - Organizations view each other in context of long term, solve problems together rather than assign blame
    - Decision-delegation to 3Ps
  - Some lopsided
    - One expecting the relationship to grow, other questioning relationship
    - One investing and risk-taking, other limiting exposure
  - Some ‘on hold’
- ✿ Collaborative efforts
  - Limited use of CPFR
  - Common use of VMI, CRP
  - High degree of coordination with 3Ps, ‘turnkey’ providers
- ✿ Tools and frameworks facilitate collaboration
  - Clearly defined stages of relationship development for suppliers
  - Tools for relationship assessment, master collaboration agreement

# Knowledge Exchange & Coordination – A few thoughts

- ✱ Currently suppliers bundle ‘commodity products’ (according to many customers) with value-added services at no added cost
  - Customers still often buying on price, getting ‘free’ services
- ✱ Is this a point for work realignment?
  - For supplier, consider unbundling offer into product & separate service?
    - Services (analyses, technology development, innovation) may generate higher profits than products
    - Product sales may become ‘perfect’ market, but isn’t it close to that now?
    - High risk of losing ‘brand’ value – not attractive to ‘branded’ providers but attractive to low cost providers
    - How would unbundling services from products affect the relationship?
  - For the industry, is this a potential point to redefine and restructure the value added by each party?
    - More thoughtful ‘outsourcing’ of these services may result in a different way to separate the value-addition
    - How will splitting into separate product and service companies affect the suppliers’ long-term viability?

# Communication – Intel

- ✱ Account teams (Intel support teams) extensively used.
- ✱ Multi-tier communication protocols used, with different levels communicating at different frequencies and intensities.
- ✱ NPI and ongoing replenishment required distinct communication processes.
- ✱ All suppliers indicated eRoom improved communication.

# Communication – P&G

- ✿ Account teams (bow-tie, centralized support teams) used with all customers
  - Standard levels of support defined by account size
  - Account liaison ‘customizes’ the relationship to provide higher levels of service and support resources
- ✿ Single point-of-contact per product used with suppliers
  - Multiple contacts for suppliers
  - Standard levels of supplier support defined by strategic importance of account
    - Management reviews only for top two levels
  - Liaison role ranging from ‘advocate’ to policy & performance cop
  - Portfolio and cost-versus-benefit-to-serve analyses needed

# Risk Imbalances – Intel

## *Risks to Suppliers*

## *Intel's Contribution*

Significant up front investment in production facilities	No volume commitments in the long term
Provision of higher capacity than forecast for upside flexibilities	Excessive bullwhip, did not honor commitments
No volume assurance due to allocation among multiple suppliers	Principle of “competitiveness among suppliers”

# Risk Imbalances – P&G

## *Risks to Suppliers*

## *P&G's Contribution*

Significant up front investment in production facilities	No volume commitments in the long term
Provision of required forecast capacity but forecast overstated	Excessive bullwhip, did honor implicit commitments after mediation
Volume assurance via contracts only after painful failures (for both)	Mix of “competitiveness among suppliers” and collaboration for LT

# Risk Alignment Issues – Intel

- ✱ Suppliers felt risks were not equitably shared between Intel and suppliers (all except one).
- ✱ Contracts were felt to be loop-sided in Intel's favor.
- ✱ Seems to have limitless flexibilities requirements (victim of powerful bullwhip).
- ✱ Suppliers do “rate” their customers in terms of order stability.
- ✱ Performance measures did not measure nor capture suppliers' ability to respond to order forecast changes.

# Risk Alignment Issues – P&G

## ✿ Suppliers ultimately compensated for investments to support P&G

- Without agreements, parties ‘negotiated’ over making other party whole, painful learning experiences
- New wisdom: Create an agreement or contract to provide for risk mediation but ‘we hope to keep it in the drawer’ to foster collaboration

## ✿ Suppliers felt risks reasonably shared between P&G and suppliers

- Risks balanced by price, capital compensation
- Less balanced however for suppliers of low strategic importance



# Risk Concerns – Intel

- ☀ “Intel is moving away from partnering relationship to adversarial one.”
- ☀ “Some other customers of ours are more forward looking, trying to forego short-term gains for a long term partner relationship.”
- ☀ “There should be a sufficient ROI for suppliers too.”
- ☀ “We have other customers who have almost negligible order changes once committed.”
- ☀ “Our new contract with Intel has many penalty clauses. Of all the companies that I have dealt with, Intel is the shrewdest among all.”

# Risk Concerns – P&G

- ✿ ‘They (P&G) are trying to “get the most from their dollar” now, more price oriented and less total delivered cost or total use cost oriented’
- ✿ ‘We are treated like a commodity supplier when we provide technical support and value add’
- ✿ ‘P&G is really learning how to think like one of their customers, becoming more flexible, better at listening’
- ✿ Different messages to different parties
  - Risk for P&G with high dependence on 3Ps (service, training for P&G)
- ✿ Tailoring relationship to different situations
  - Less collaborative in products and services evolving to commodities
  - Listening better where there is more to gain

# Organizational Linkage (A)– P&G

- ✱ Consistent observation (internal, external) that P&G changing
  - Not consistent how they are changing (see previous slide)
- ✱ Management undecided whether and how to collaborate
  - Conflicting messages to P&G, customers and suppliers
  - Local relationship managers charged with buffering other parties
- ✱ Corporate policy less collaborative...
  - Standard set of terms for customers and standard support for different levels of suppliers – fixed!
  - Requires local leader to set collaborative tone (more buffering)
  - Is this... ‘Postponed Customization of Relationship’ with a standard corporate policy that is ‘customized’ at the interface? If so, requires high degree of continuity at the interface to be effective

# Organizational Linkage (B)– P&G

- ✦ Each relationship with other party has multiple points of contact
  - Commercial, logistics/operations, technology, product development
  - Quality and level of collaboration of each point of contact varies significantly
  - Net result is lower performance when the multiple points of contact are not managed as a portfolio or as elements of an overall relationship
- ✦ Strong collaboration observed where both parties:
  - Had cultures with a ‘dispassionate willingness to look at data’ and an openness in problem solving, ‘willing to put the moose on the table’
  - Have a systems, long-term view of the relationship
  - Look at collaboration as method for growth, not just cost management
    - One team was called ‘Joint Optimization Results’
  - Orientation towards getting results
  - Shared a common view and assessment of the relationship

## What About Contract Manufacturers – Intel

	<i>Jabil</i>	<i>Solectron</i>
Information sharing	Little visibility to Intel, special reports on request	Lots to Intel, little from Intel, no ERP linkage
Coordination	Coordinated plan, technology road map sharing	Some VMI, no CPFR
Communication	Too many points of contacts and over-interactions	Customer-focused teams involved

## What About 3PL & Service Providers – P&G

Information sharing	High visibility to 3P, limited automation
Coordination	High degree of 3P autonomy, Decision-making responsibility and authority
Communication	P&G dependent on 3P for training P&G employees

# Solectron Observations – Intel

- ☀ “Solectron is very open to more collaborative relationships with Intel, but we are not there yet.”
- ☀ Strong desire by Solectron to participate and collaborate in Intel’s NPI process.
- ☀ “Intel’s cost targets are sometimes hard to meet.”
- ☀ “To meet Intel’s requirement, we sometimes have to set aside additional capacities at our cost.”
- ☀ Does not think that Intel treats Solectron as a strategic partner.
- ☀ Greatest value Intel brought to Solectron is its ability to create new market segments.

# Intel's View of Solectron – Intel

- ☀ Intel is beginning to share more business road map, forecasts, and NPI information.
- ☀ “Yes, the biggest complaints from Solectron is our forecasts and the cost pressure we put on them.”
- ☀ “Solectron does not share with us detailed information on component pricing.”
- ☀ “Intel has shared the risk (cost) of having Solectron set up extra capacity.”

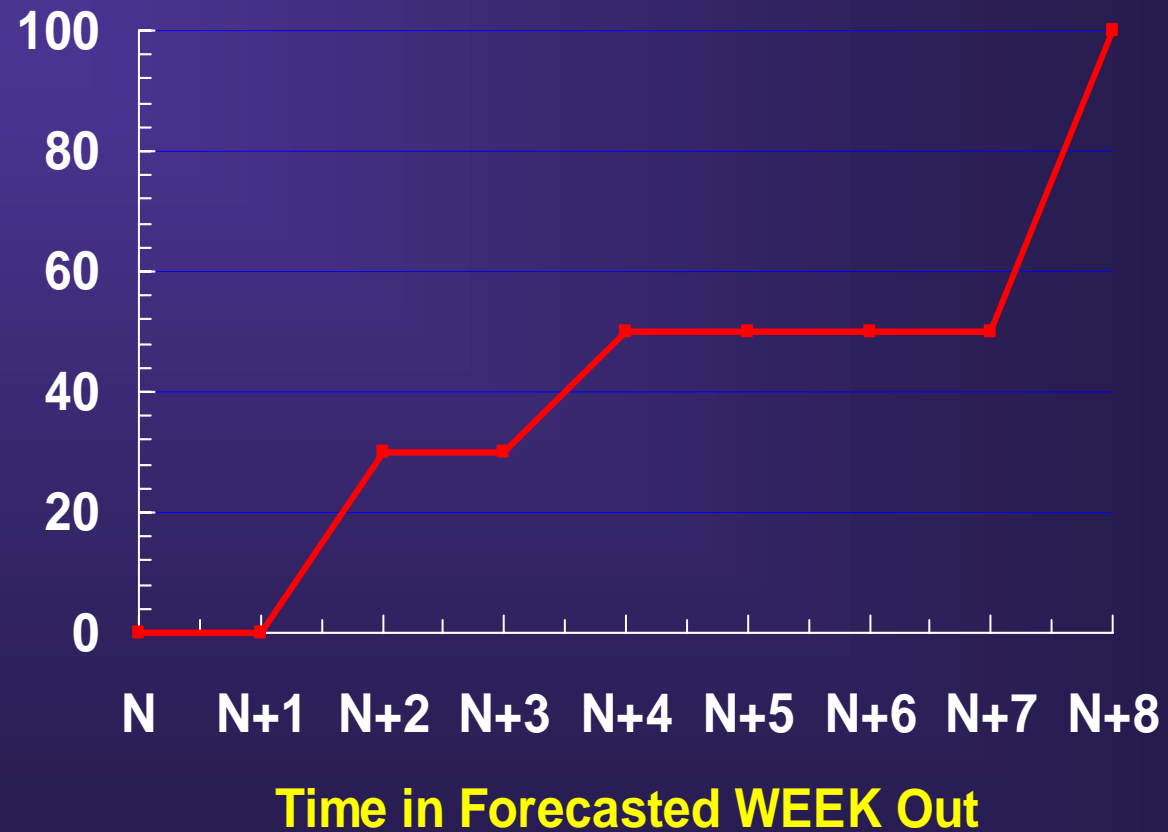


# Jabil Observations

- ✱ Explicit time-phased flexibility profile used.
- ✱ Well-defined liability boundaries: Jabil for standard components; Intel for custom ones.
- ✱ Cost coverage negotiation possible in case of sudden changes in production schedule.
- ✱ Jabil reluctant to give more information visibility to Intel for fear of micro-management.
- ✱ Multiple points of contact each demanding special attention created confusion & inefficiency.
- ✱ “Intel is very risk-averse.”

# Time-Phased Flexibilities at Jabil

Allowable  
change in  
forecasts in  
percent (+/-)



# What About Customers – Stanford

*Dell*

Information sharing	Reasonable visibility to both, but not integrated
Coordination	Amateur VMI, collaborative forecasting
Communication	Too many layers in organization

# Dell Observations

- ✱ Dell provides extensive information visibility to Intel, but only gets limited visibility (inventory, committed orders) from Intel.
- ✱ Dell desires regional supplier hubs (VMI), not provided by Intel currently.
- ✱ “Doing business with Intel is not easy. It is an *intellectual property-driven* company preventing them from being more open.”
- ✱ “To get a piece of information, you have to go through layers and layers of managers and program managers.”

# How did Intel View Suppliers

- ✿ “Supplier development not rapid enough to keep pace with Intel.”
- ✿ “Suppliers are too risk-averse, thinking that we are not an equal partner in the sharing of investments and risks.”
- ✿ “Need to create more trust with suppliers.”
- ✿ “Everything is changing so fast that we need suppliers to be responsive and flexible.”
- ✿ “Suppliers are asking for too much information, like competitors’ prices, technology plans and capacity, which we of course cannot reveal.”
- ✿ “We have shared risks with suppliers – one time we prepaid half of the up front investment to build a new facility and we lost heavily.”

# Additional Intel Views

- ✿ “Intel has set up more alliance agreements with companies like Ibiden and Shinko to pursue knowledge and technology sharing.”
- ✿ “If Intel shares more information with a customer, it may actually confuse them.”
- ✿ “We are surprised that the suppliers felt that risks were not equally shared. Indeed, we were quite risk taking! The problem is that risks that we took were not documented.”
- ✿ “Suppliers value long term relationships.”
- ✿ “We do need to be more formal in recognizing the suppliers’ flexibility performance.”

# Other P&G Related Views

- ✿ “P&G puts more effort and resources into the relationship at all levels, but they don’t have the best relationship. (We have) better relationships with smaller suppliers that have fewer resources but are more responsive and more prepared to adapt to (our) requirements, maybe even more capable to respond.”
- ✿ “P&G is evolving and beginning to understand the storefront perspective of the retailer, P&G thinking like this is their store.”
- ✿ “People who’ve been around for three years can bring value-added service to the customer that somebody new, no matter how smart, isn’t able to bring.”
- ✿ “One of the biggest challenges our team faces is the fact that we’re charged with really pushing the envelope and creating the future and many times, our company (P&G) isn’t ready to go there yet. So we aren’t really committed about doing things differently but rather we tend to feed the masses.”
- ✿ ‘If a company wants to collaborate with us, we will say to the prospective supplier “What are you going to give us?” or “How much of that saving do we get?”’  
(P&G comment, P&G customer comment)

# Summary – Stanford

- ✿ Intel is at various degrees of supply chain integration with its suppliers; with reasonable level of information integration, coordination and collaboration.
- ✿ Room for expanding controlled information sharing and VMI relationships.
- ✿ The biggest challenge is the perceived inequitable risk sharing by suppliers, primarily from unclear demands for flexibilities and bullwhip protections.
- ✿ Lack of formal performance monitoring of flexibilities can hurt partnership relationships.



# Lack of Formal Ordering Rule Flexibility Metrics

## *No Flexibility Metrics*

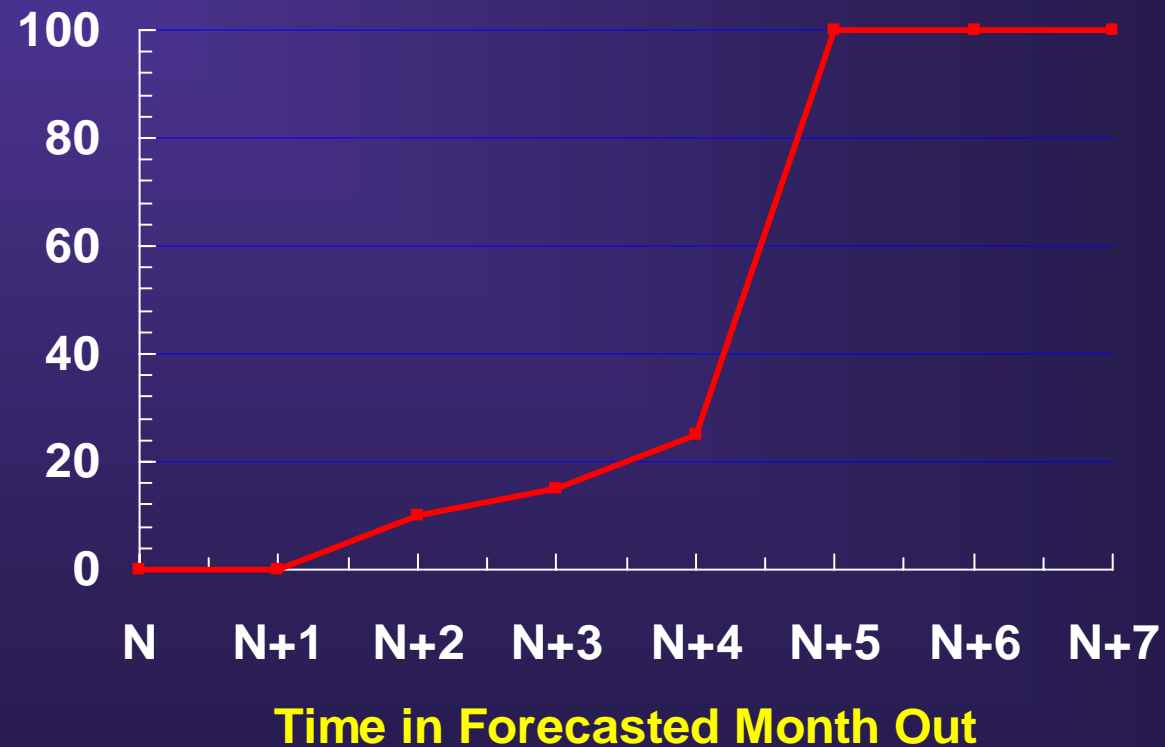
- ✿ Current score card:
  - On time delivery
  - Quality pass rate
  - Shipped correct
  - Inventory turns
- ✿ Flexibility (ability to ramp up and down) important criteria, but not explicitly measured.

## *Problems*

- ✿ Qualitative judgment too subjective.
- ✿ Source of friction and misunderstanding.
- ✿ Hard for supplier to know what to shoot for, or invest to create flexibility.
- ✿ Difficult for supplier to make a concrete case to show improvement.

# An Example of Ordering Rule with Time-Phased Flexibilities

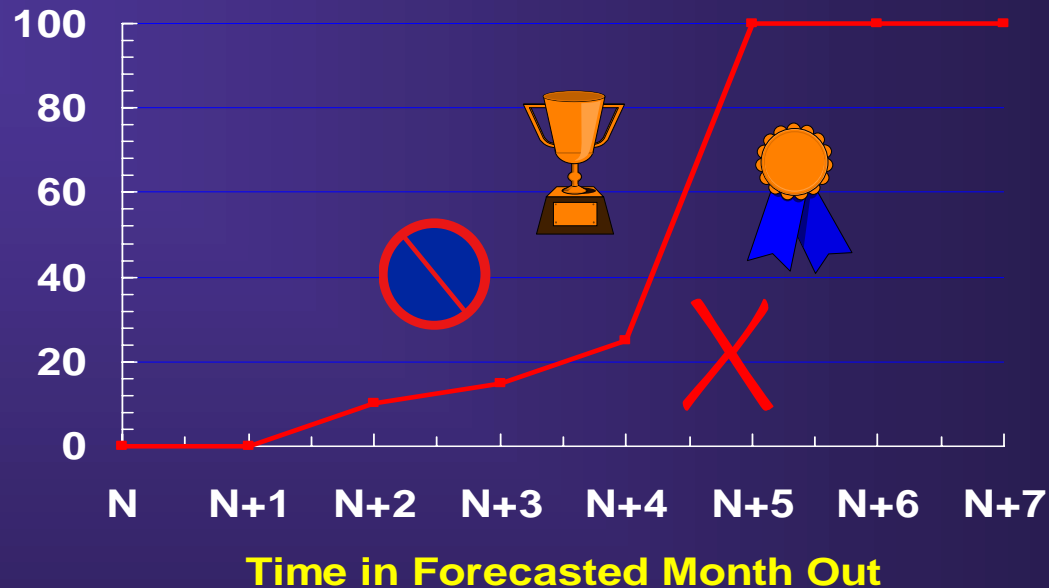
Allowable  
change in  
forecasts in  
percent (+/-)





# Flexibility Metric

Allowable change in forecasts in percent (+/-)



Outside flexibility limit, but achieved by supplier.



Inside flexibility limit, but achieved by supplier.



Outside flexibility limit, but failed to be achieved by supplier.

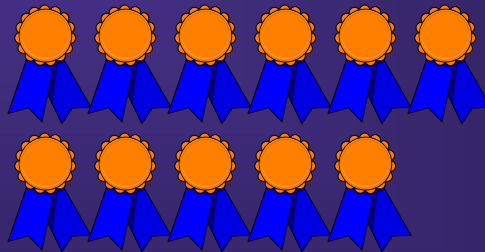


Inside flexibility limit, but failed to be achieved by supplier.

# Measuring Flexibility Metric

Changes Within Flexibility Limit      Changes Outside Flexibility Limit

Achieved by Supplier



Not Achieved by Supplier



# Maintaining Successful Partnership – Stanford

- ✿ Intel's push on IT-based integration:
  - Migration to XML-based connectivity
  - RosettaNet standards
  - eRoom
- ✿ Intel scoring high on being:
  - Demanding supplier in technology & quality
  - Collaborative improvement initiatives
  - Sharing technology roadmaps
- ✿ Overall multi-tiered communication structure with account teams working well.
- ✿ Rigorous and consistent performance measures.

## But More are Needed – Stanford

- ✱ Consider some controlled visibility of demand and capacity for suppliers.
- ✱ Coordination efforts like VMI is just emerging, but can be better defined and implemented.
- ✱ Order flexibility is a major source of friction:
  - Need to formalize agreement
  - Risk/reward sharing
  - Need to measure and monitor
- ✱ Transparency of performance measures, incentives, risk sharing schemes, and responsibilities.

# Experiential Learning

Information Integration	<ul style="list-style-type: none"><li>• Identify respective info sharing requirements: what is needed, when, how often, level of detail, quality, how info to be used</li></ul>
Coordination	<ul style="list-style-type: none"><li>• Co-develop the planning process to expose implications of respective plan changes</li><li>• Co-develop a Master Collaboration Agreement</li><li>• Co-develop a risk-balancing, risk-mediation process, start with an initial mapping of the respective risks each party bears</li></ul>
Organization Linkage	<ul style="list-style-type: none"><li>• Co-develop a relationship map between the firms</li><li>• Co-develop a portfolio assessment and management process</li><li>• Co-develop: supplier cost-to-serve/benefit-of-serving model, customer cost-to-acquire/benefit-of-acquiring model</li><li>• Conduct a joint relationship assessment and reconcile (include ARTT process)</li></ul>