Flexible Product Development Research Forum

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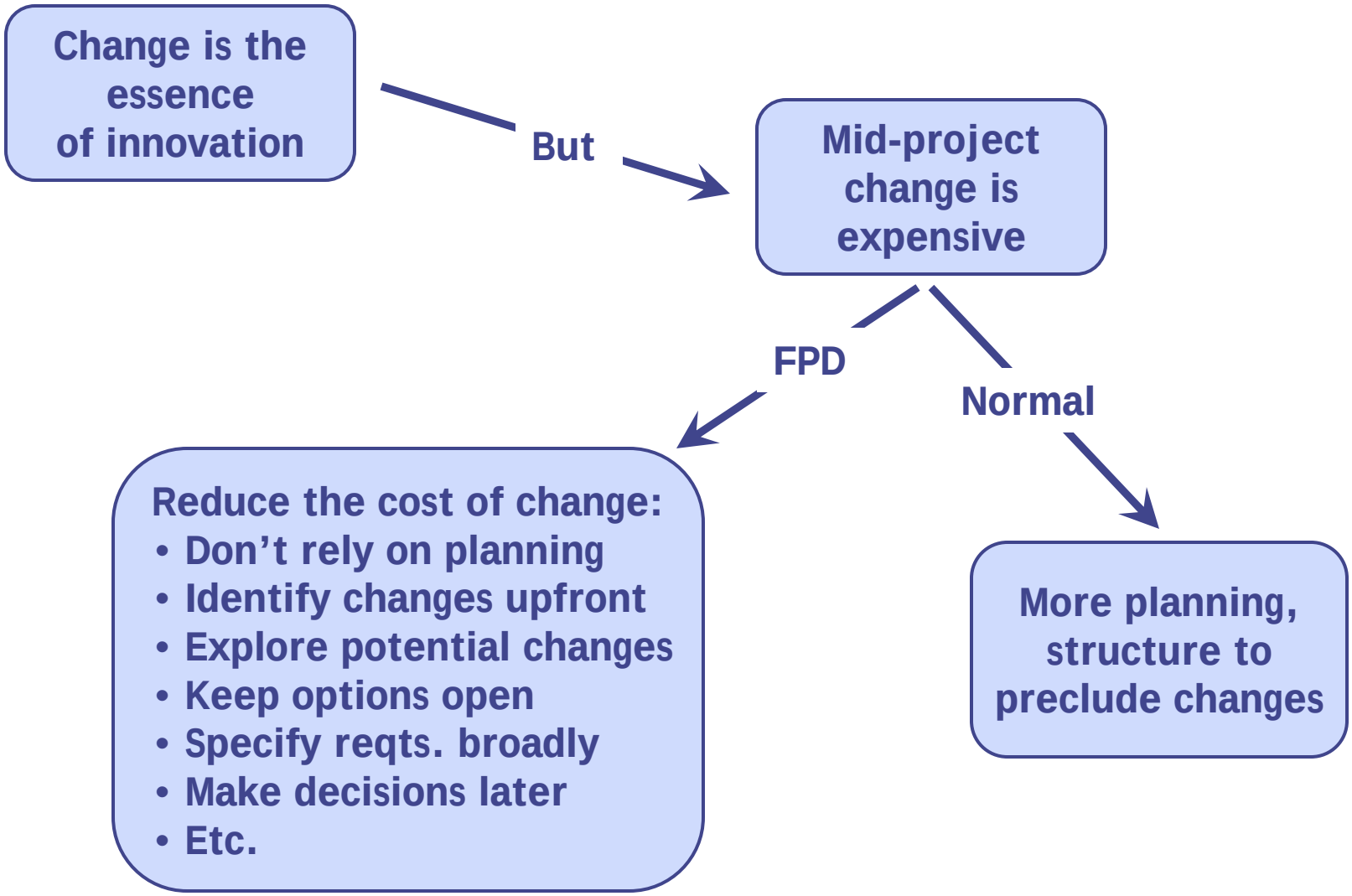
Introductions—Check-In

- **Name, organization, role in organization**
- **What do you hope to take from this forum?**

Flexible Product Development



This Research Study

Background
Book, *Flexible Product Development*, provides principles (limited experience)

Objectives
- **How actually used?**
- **Costs & benefits?**
- **Drivers of change?**
- **How is change resolved?**

Approach
- **Interviewed 16 NPD pros**
- **Variety of firms, levels**
- **Semi-structured**
- **Watched for patterns**

Findings: Change Happens

Midstream project change is a common experience

Examples

- Technical/feasibility difficulties encountered
- Product lacked adequate performance
- Better technical approach found
- Supplier encountered difficulties
- Marketing strategy changed
- Customer changed mind
- Customer needs became clearer
- Encountered manufacturing problems

Flexibility Is a Competitive Advantage

Almost always, change occurred due to unforeseen circumstances, not due to poor planning

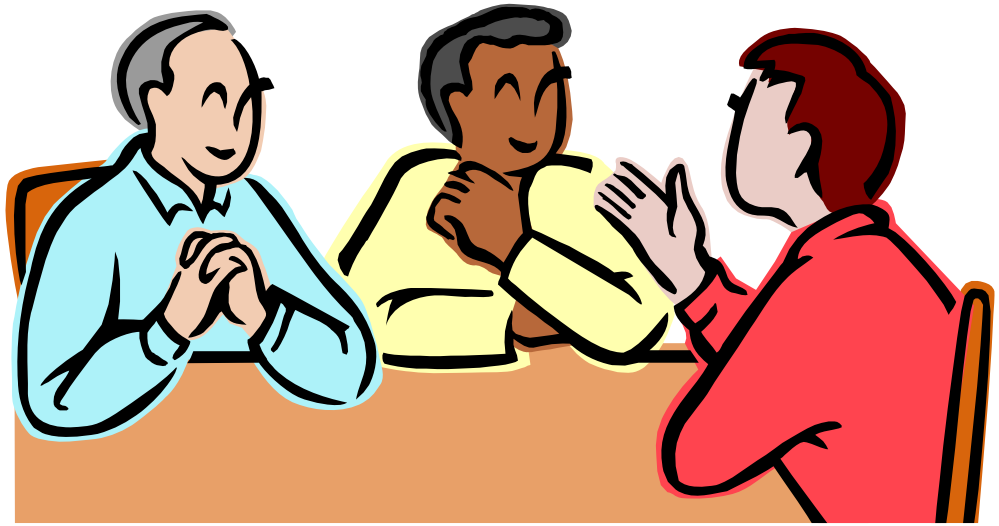
⟹ **Flexibility = Competitive Advantage**

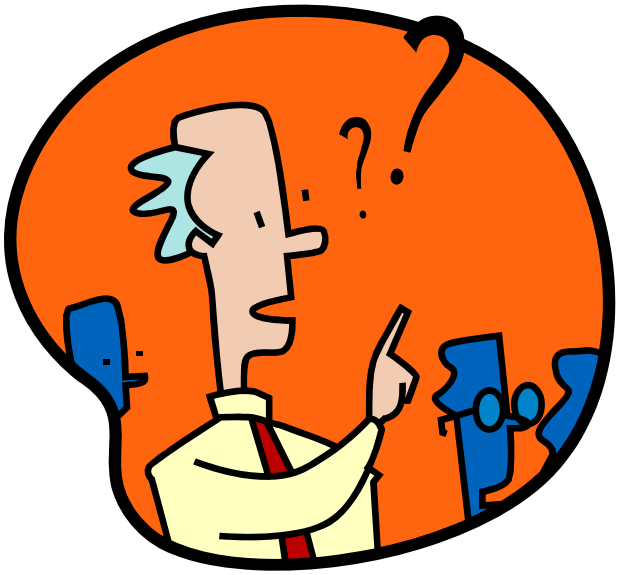
Established technology, new application. New application forced re-defining the product

Competing in high-perform-ance market. Competitor launched better-performing product

Superior features required higher performance, thus an extra (unplanned) prototype cycle

Discussion & Questions





The Cost of Change vs. the Cost of Flexibility

Mid-project change is expensive Right!

⟹ Flexibility is expensive Wrong!

Reduce cost of change:
Cost of flexibility = exploration & preparation

Options: House Fire Risk

Option 1: Do Nothing (let it burn)

Cost:
No fire: Free
Fire: Entire cost of house

Advantage: Cheaper if low risk of fire

Option 2: Buy insurance

Cost:
No fire: Annual premium
Fire: Annual premium

Advantage: Less anxiety and disruption

Options: Development Project

Option 1: Do Nothing (Assume success)

Cost of Change

Cost:
No change: Free
Change: Redesign (cost and time)

Advantage: Cheaper if low risk of change

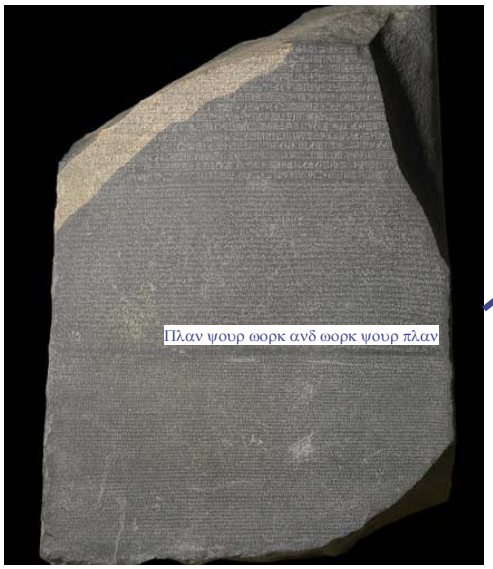
Option 2: Identify and mitigate uncertainties

Cost of Flexibility

Cost:
No change: Cost of mitigation
Change: Cost of mitigation

Advantage: Less anxiety and disruption

Finding: FPD Reduces Variance



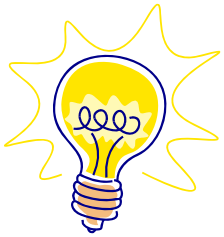
Πλαννινγ ανδ στρυχτυρε
μακε προφεχτσ πρεδιχταβλε

—

“Planning and structure make projects predictable”

NOT in a dynamic environment!

Aquarius Project



New Market Application…

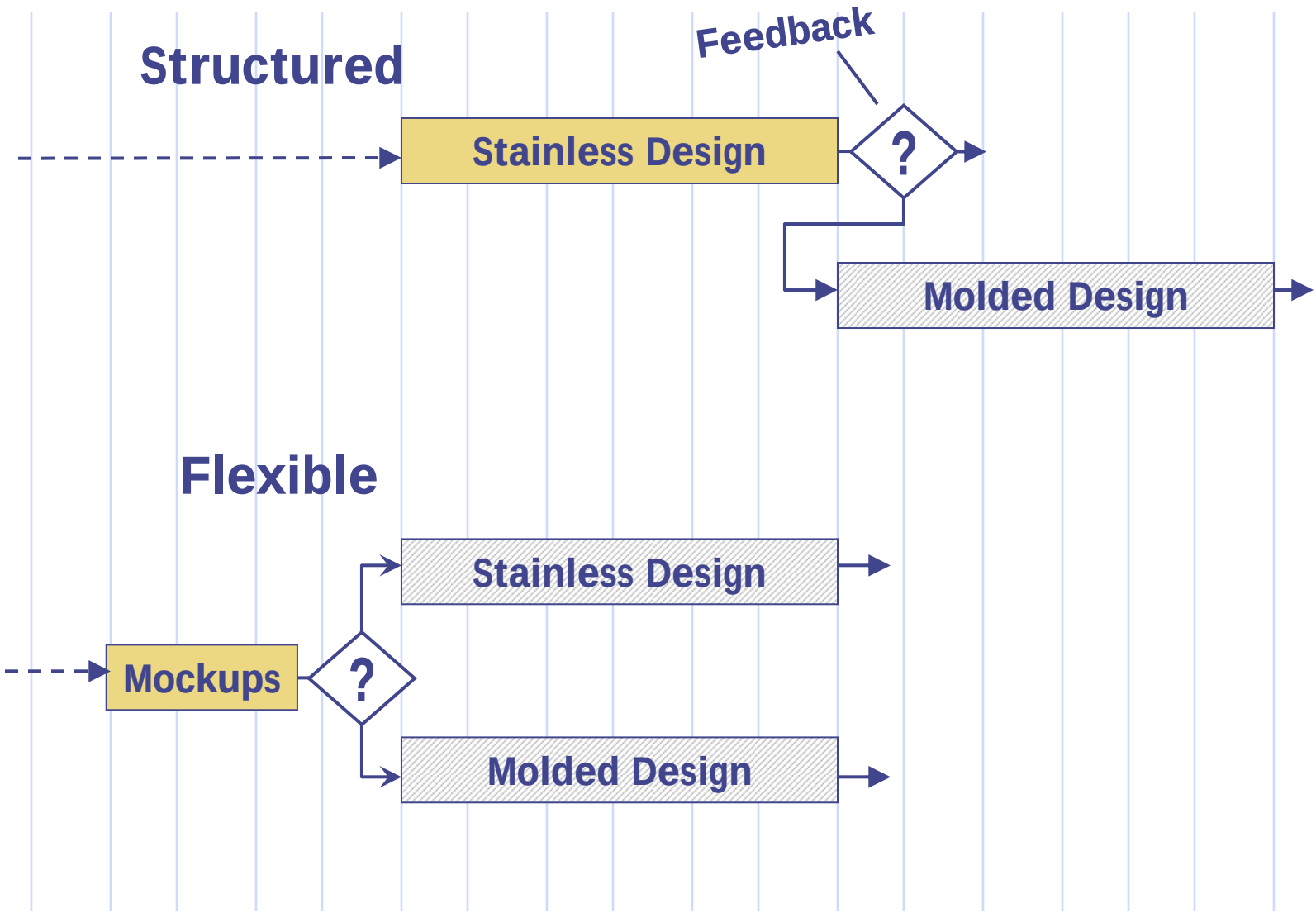
Stainless steel enclosure

- Customer suggested
- Cosmetics, weight?
- $100K, 6 months

Molded enclosure

- Lower unit cost
- Customer acceptance?
- $200K, 6 months

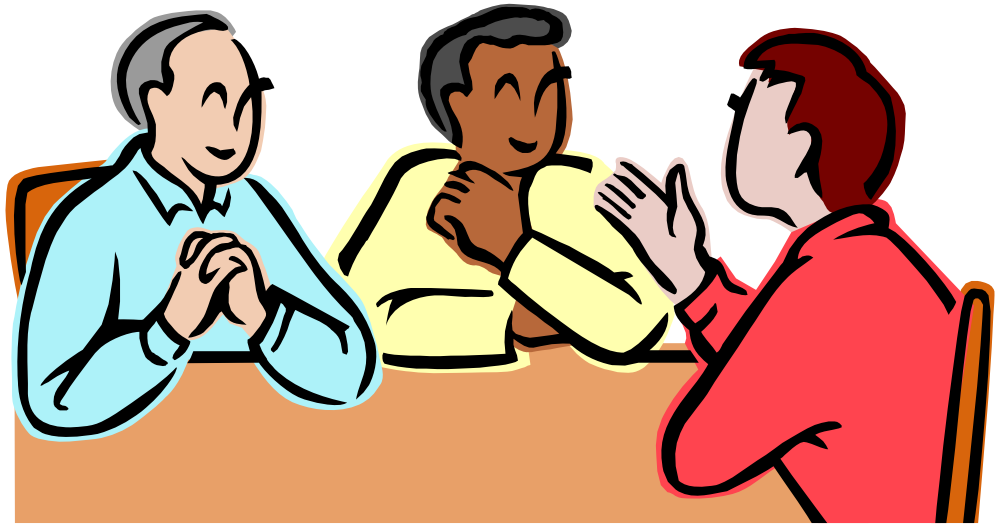
Project Plans

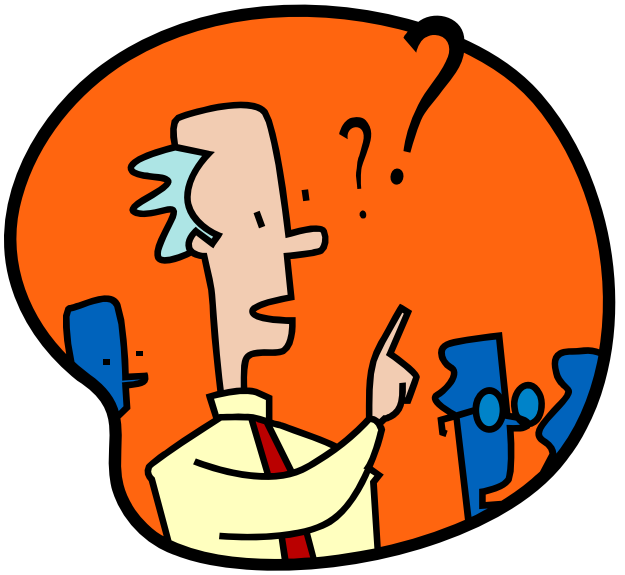


Predictable Outcomes?

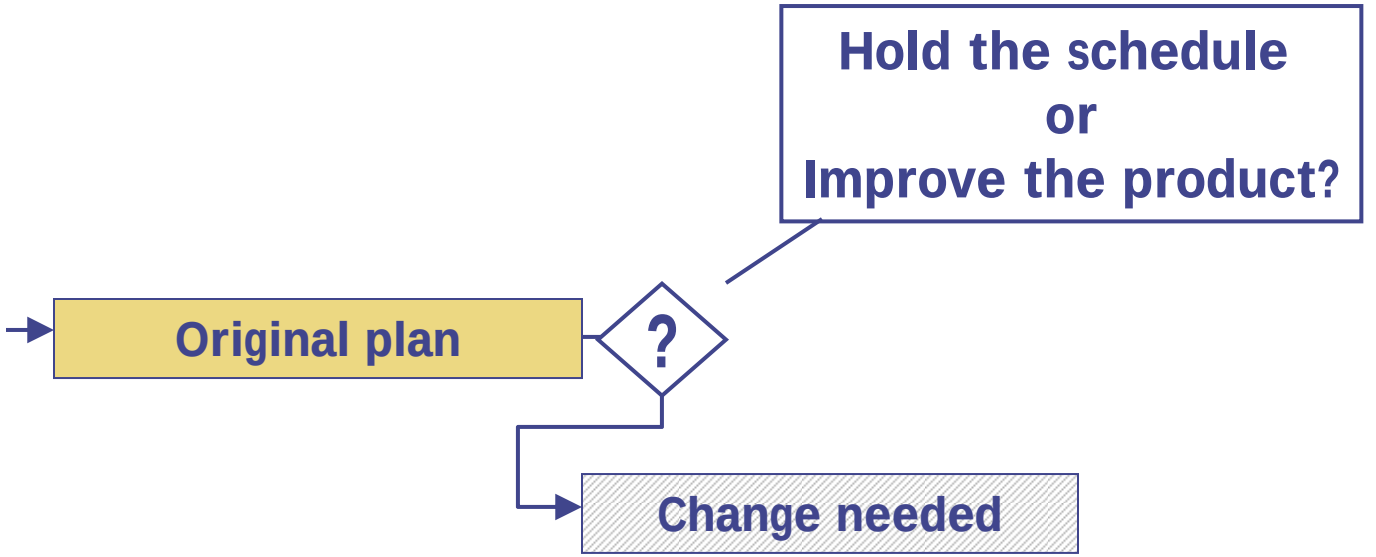
	Stainless acceptable	Molded preferred	Variance
Structured	$100K 0 months	$300K 6 months	$200K 6 mo.
Flexible	$130K 0 months	$230K 0 months	$100K 0 mo.

Discussion & Questions





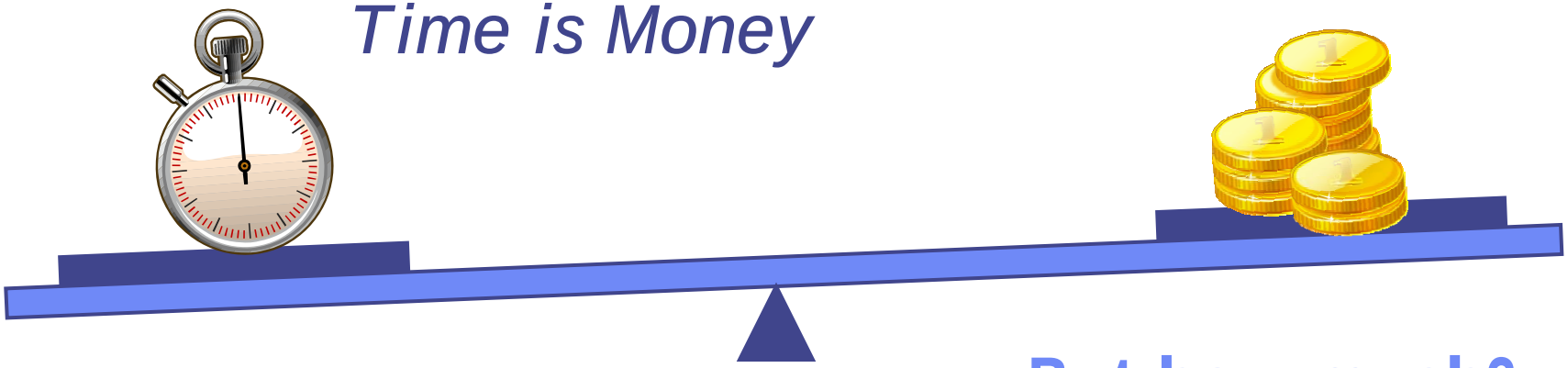
Finding: Managing Project Delay



Flexibility reduces 11th Hour crises

Delay Cost Models

Time is Money



...But how much?

Economic models clarify cost-benefit balance

Finding: Qualitative Indicators

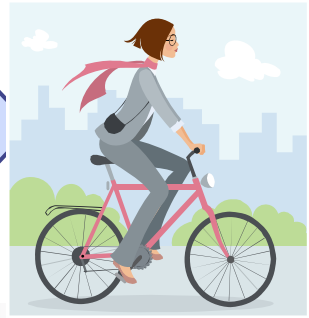
Benefits

What are our needs for structure and flexibility?

How will we know if we're out of balance?

Red Flags

Tools to maintain balance



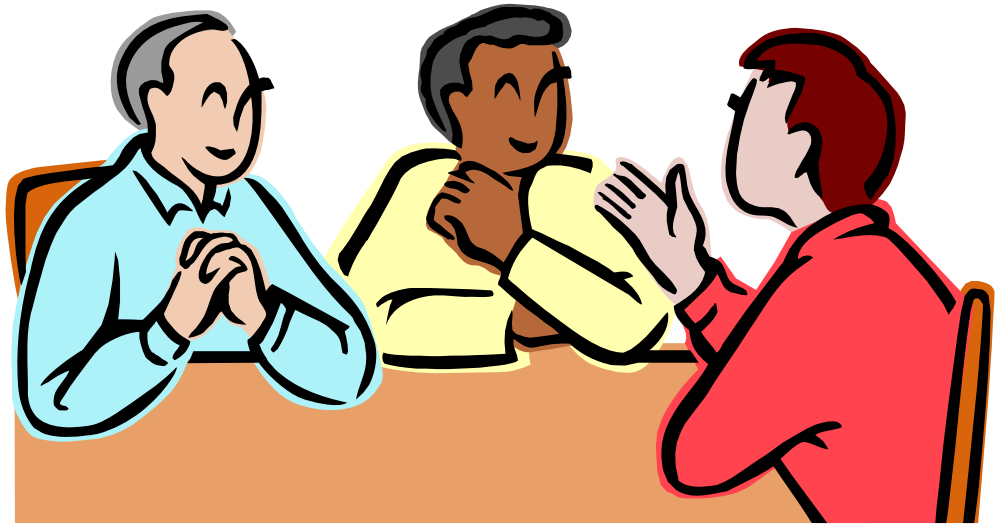
Comparative Benefits

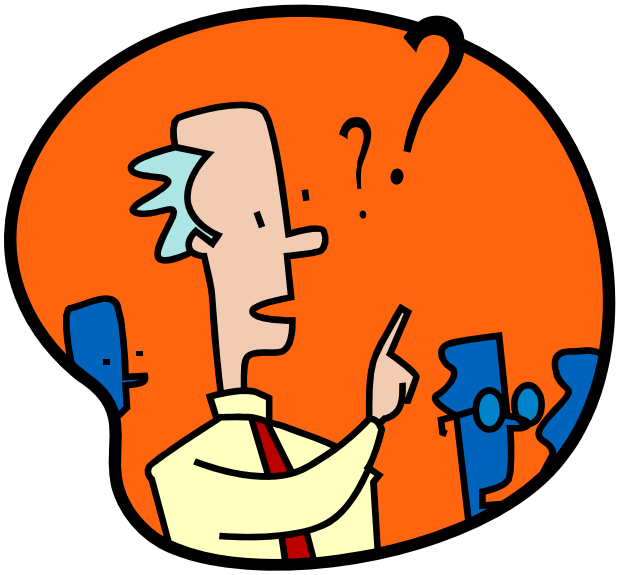
Structure	Flexibility
• Little effort wasted exploring unimportant design alternatives • Little investment in unused flexible features • **Easy to manage development resources** • Close control over design changes • Few mid-project changes • Coordinating across functional groups requires little effort • **Simple management oversight of projects**	• Reduced cost of necessary changes • **Reduced chance of post-release changes** • **Process supports innovation, learning** • Product releases meet current requirements • Development effort adapts to changing market requirements • Ability to explore & learn without "sacrificial" product releases • Can avoid schedule delays by trimming project scope

Red Flags

Too Structured	Too Flexible
• **Developers are forced to make changes after first resisting them** • Developers feel rigid development processes inhibit innovation • Developers are not following the established processes • Customers' knowledge of application and requirements appears to change during your development • **It's less risky to fail following the process than to succeed by deviating from it** • Available technologies change during the course of the development project **- - -**	• Developers are uncomfortable deviating from familiar structured processes • **Changes jeopardize critical product requirements** • Managers have poor oversight of project plans and schedules • High communication overhead on large or complex projects • Changes have unforeseen side effects in complex, interconnected technology • **Development team has difficulty implementing changes due to inexperience or high turnover** **- - -**

Discussion & Questions





Flexibility Can Be Good or Bad

If you are driving change, e.g., the manager, flexibility is beneficial

If you are executing change, e.g., the managed, flexibility is a pain

Moral: Flexibility requires better up-down communication of costs and benefits—both economic and psychological

Flexibility Demands Fundamental Change

Response by one of the interviewees who declined to join us today:

I would like to attend this forum, but it may just make me more depressed. Most of the Sr. managers here have been replaced by a set of true believers in the "Toyota Way" and who expect product development to not only follow a strict waterfall model, but insist that design processes be developed to ensure that the very first prototype is 100% perfect and manufacturable in volume.

I just got a reprimand memo from my manager about an LED spacer I selected for a 1st prototype that was too tall by 1/8 inch, requiring us to rework 15 circuit boards with the shorter, off-the-shelf part. To avoid this type of mistake, it would have taken a bunch of time to develop a complete 3-D CAD model of the 1st proto circuit board layout, delaying the project a bunch.

Flexibility Demands Fundamental Change

Examples of potentially misaligned culture, processes, and management systems:*

- **Creating project plans that lack uncertainty plans**
- **Attempting to lock everything down in initial plans**
- **Believing that prototypes are for verification only and should be perfect**
- **Making prototyping resources difficult to access**
- **Punishing rather than learning from failure**
- **Assuming that customers know what they want and won't change their minds**
- **Closing options quickly, not investing in early exploration**
- **Regarding unused options as waste**
- **Using easy-for-management gate reviews rather than ongoing review**
- **Basing metrics on conformance to plan**
- **Running all projects according to the same process**

* If this list is too short for you, please see p. 232 of *Flexible Product Development*

Discussion & Questions