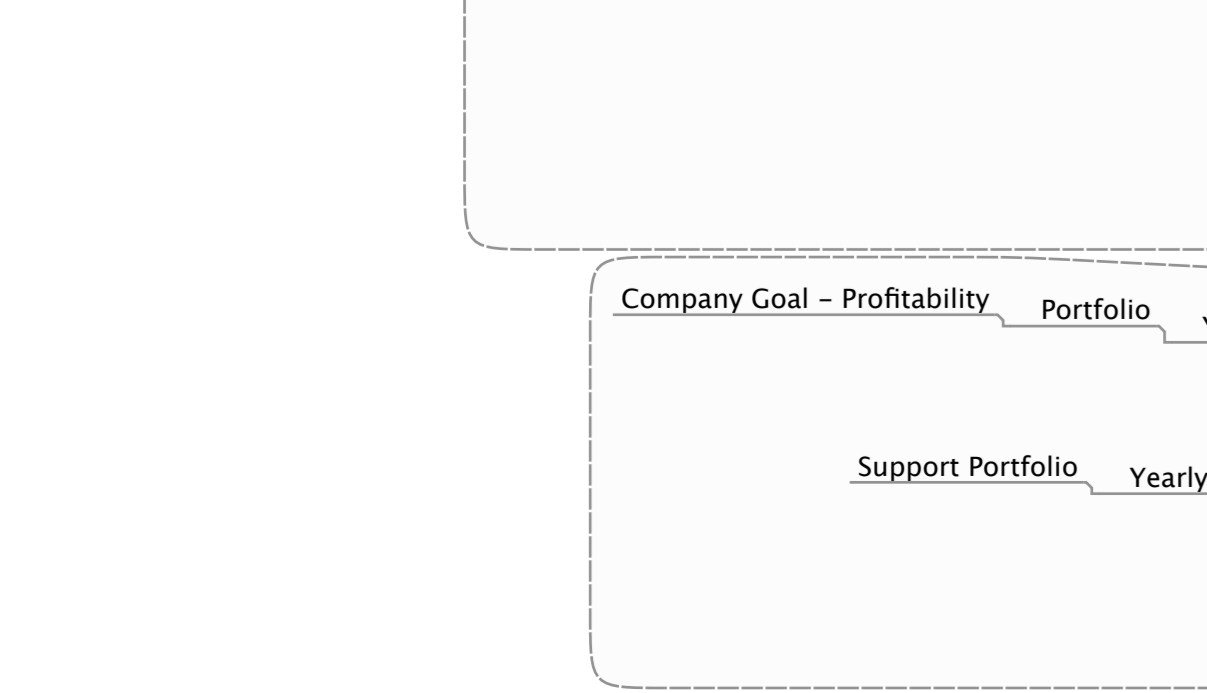
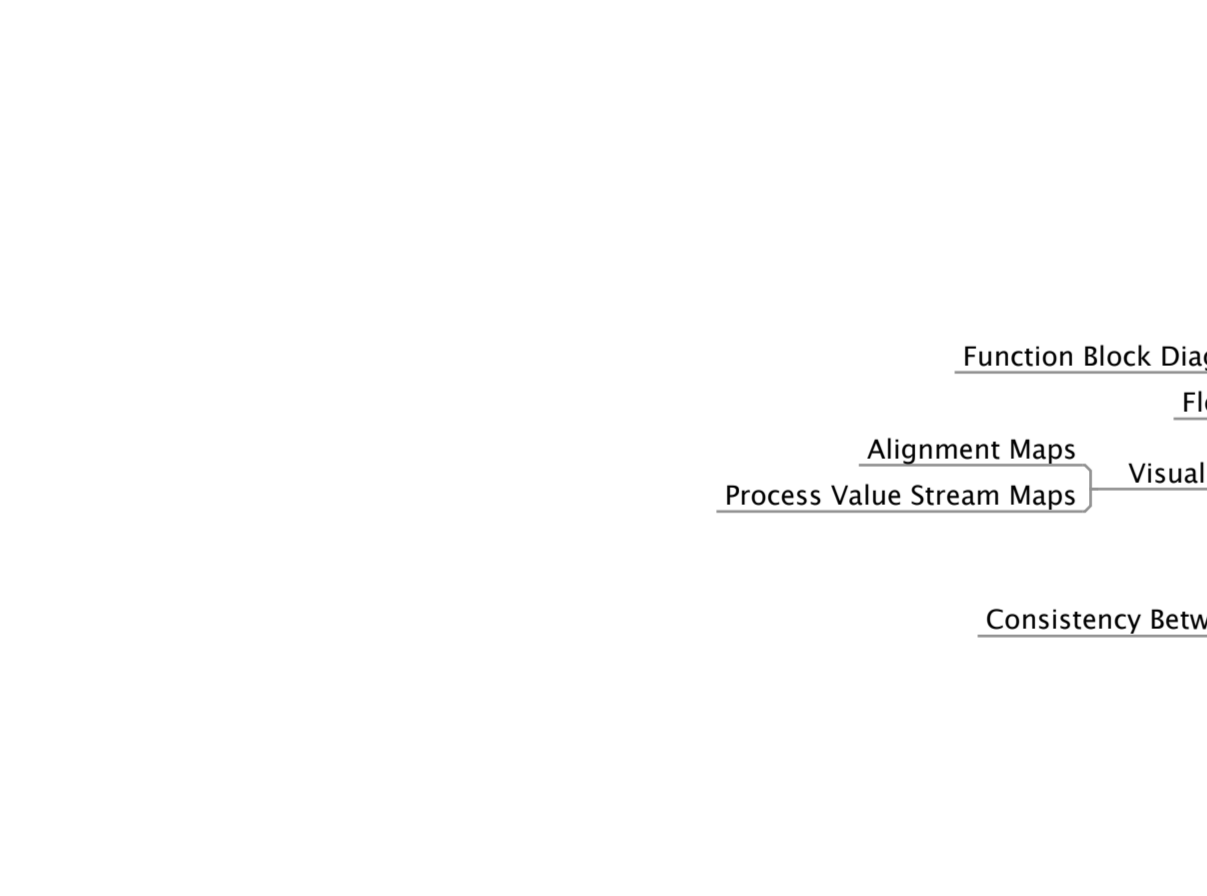
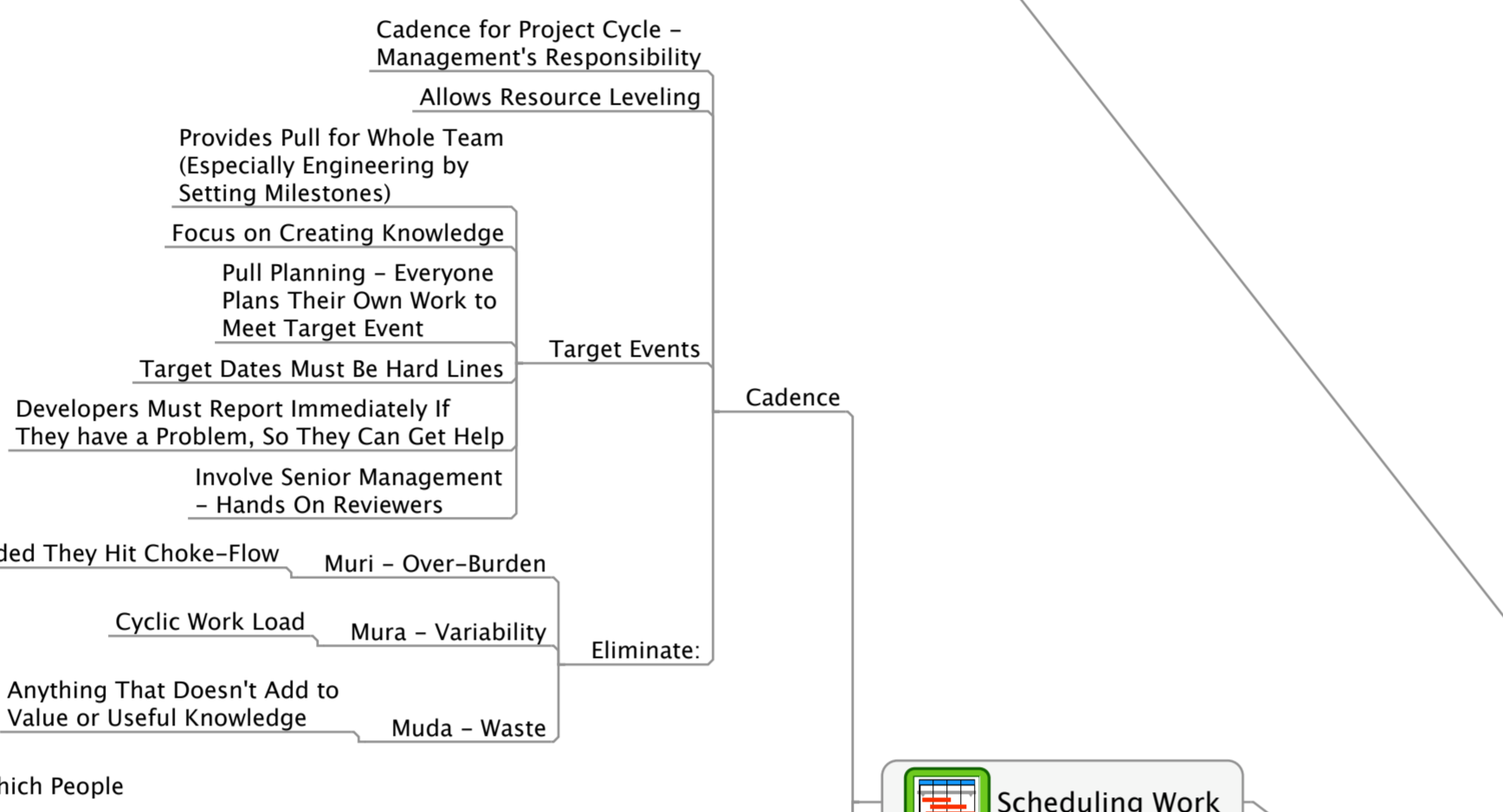
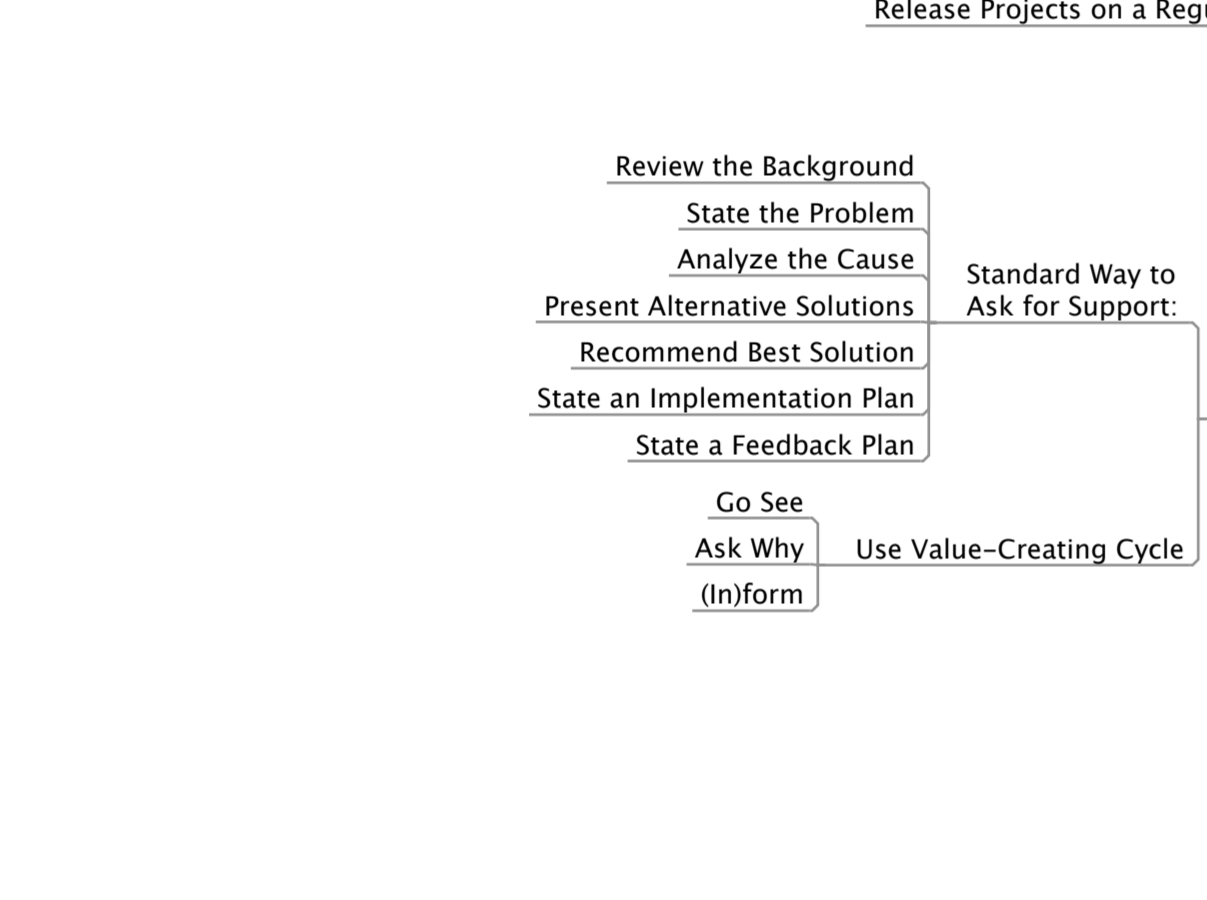
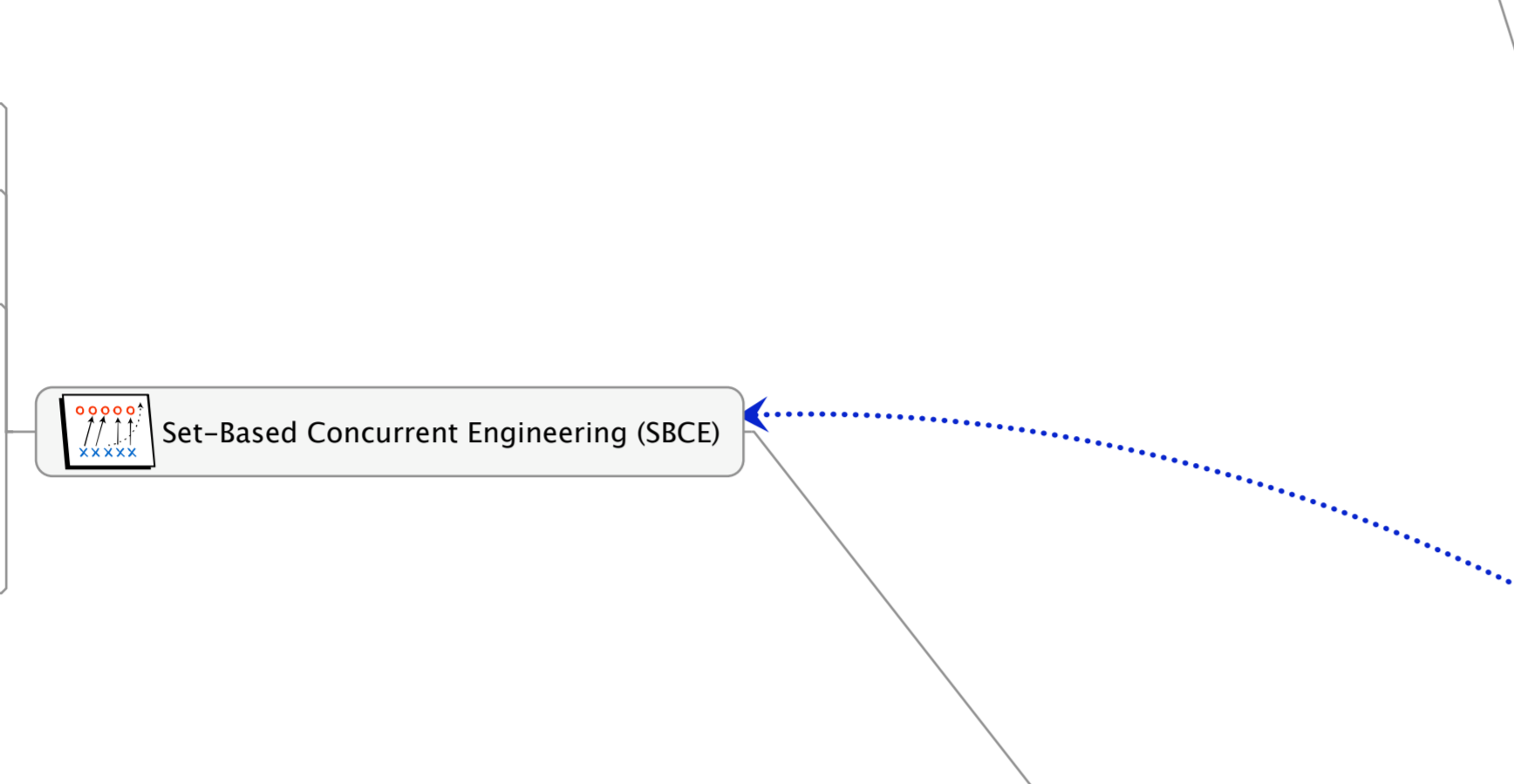
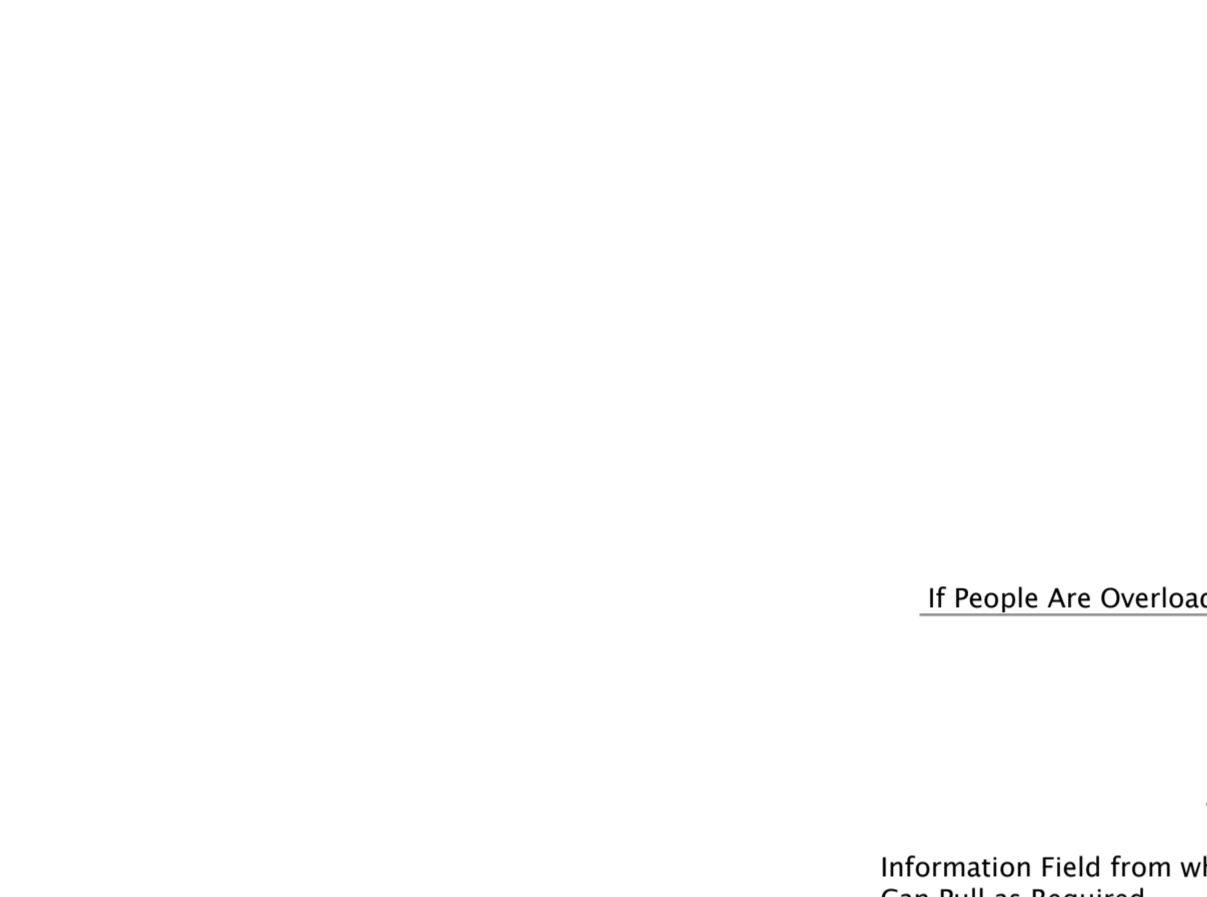
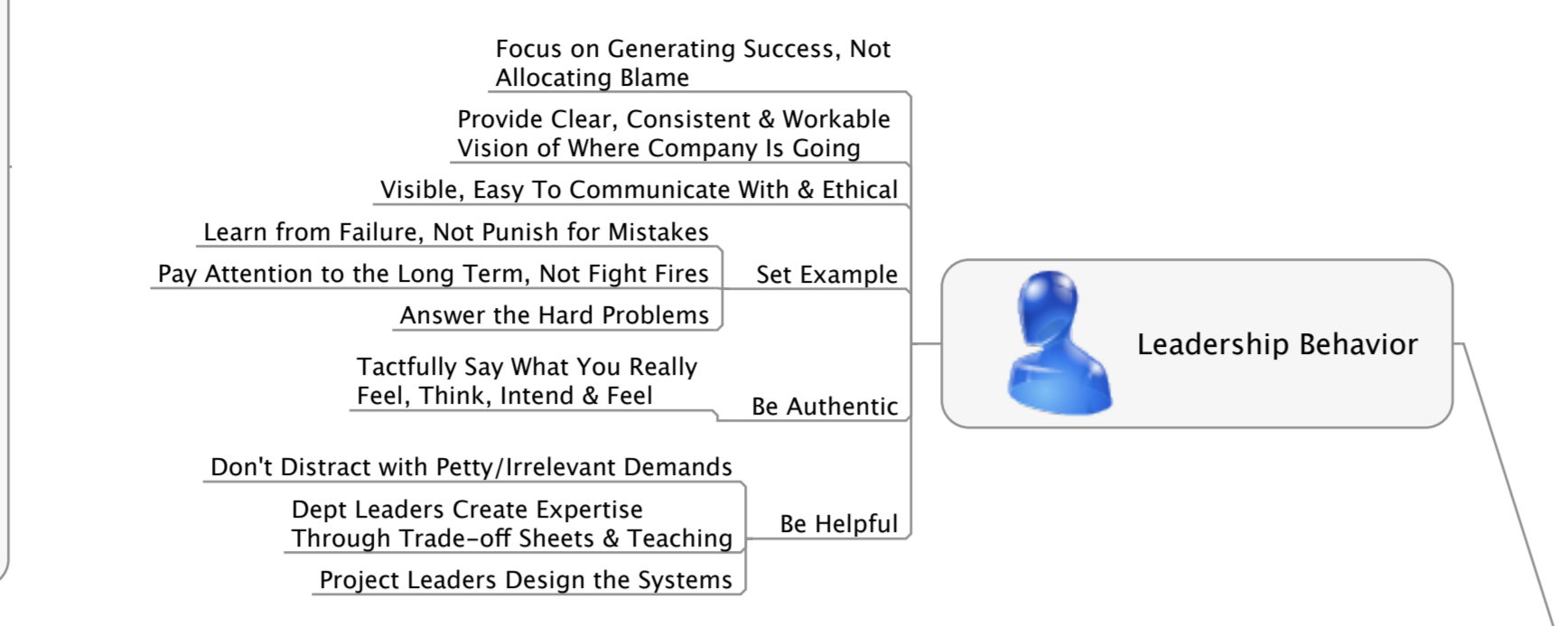
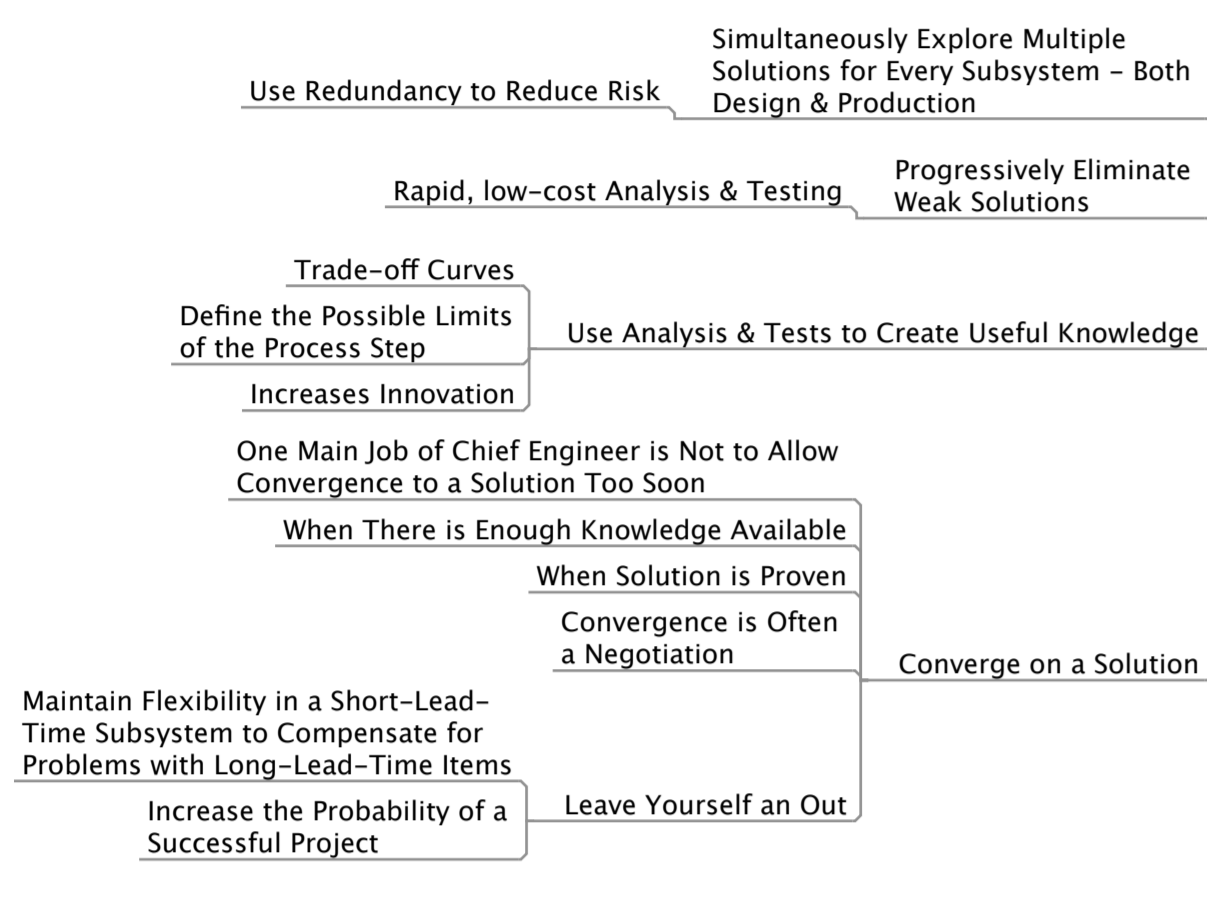
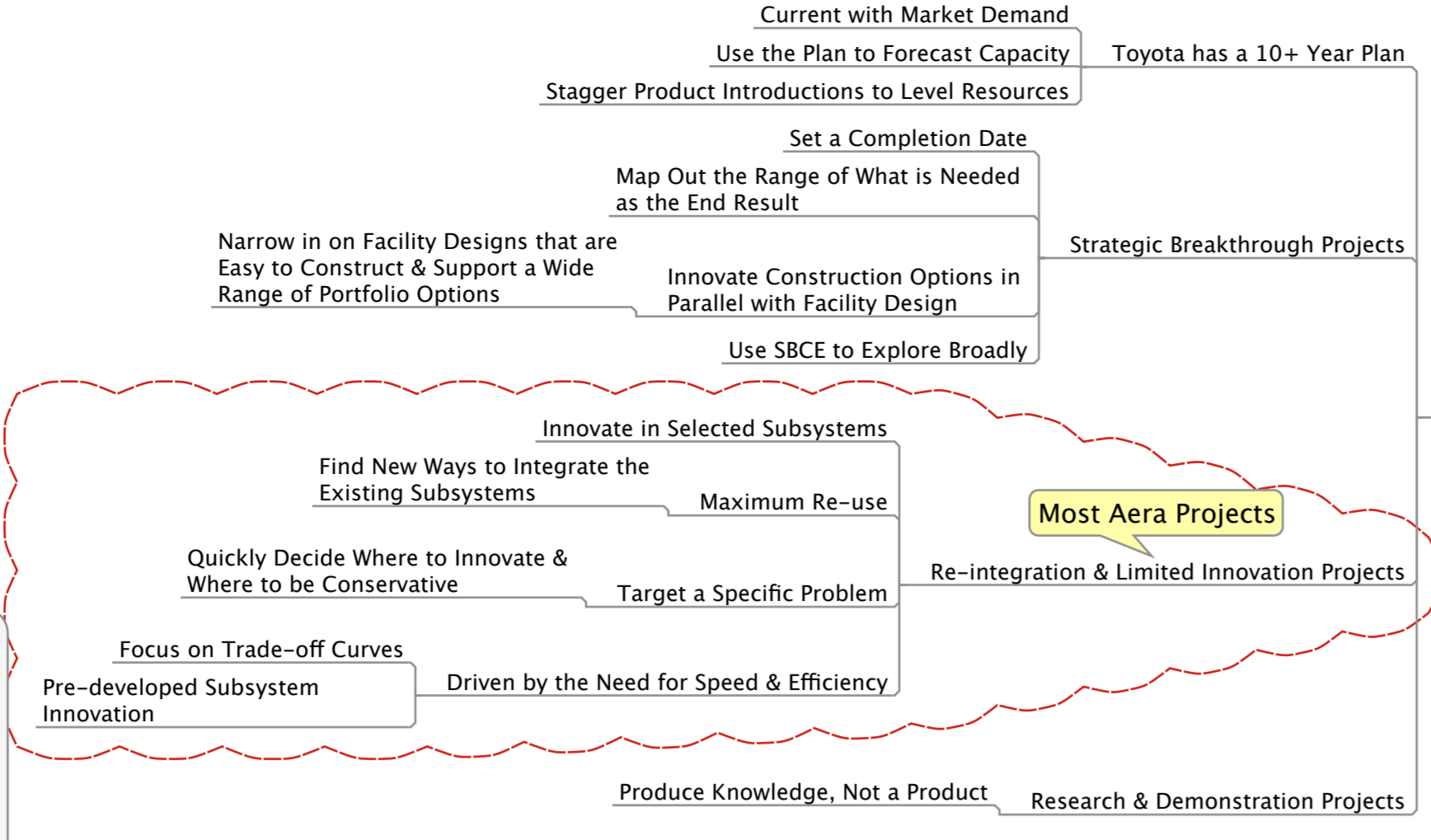
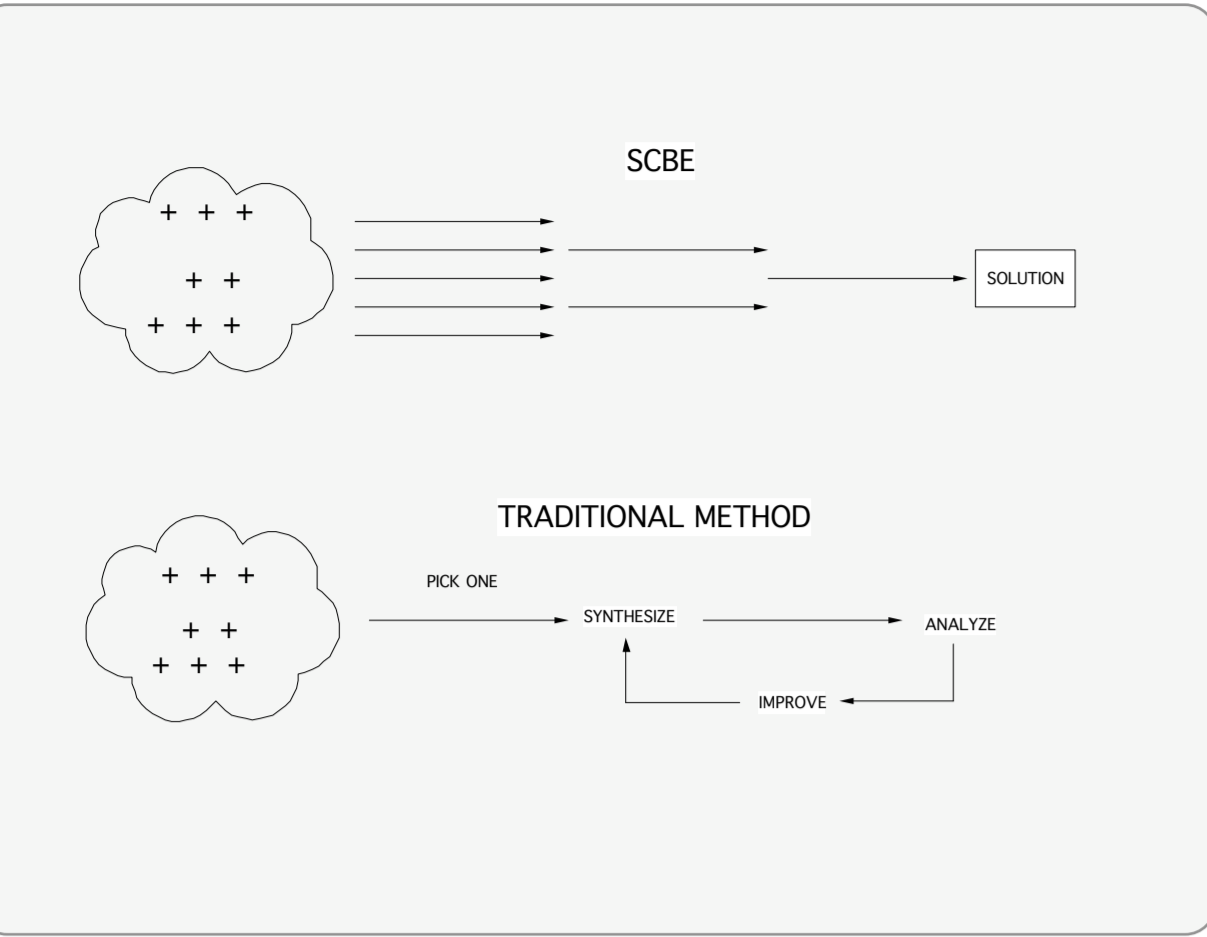
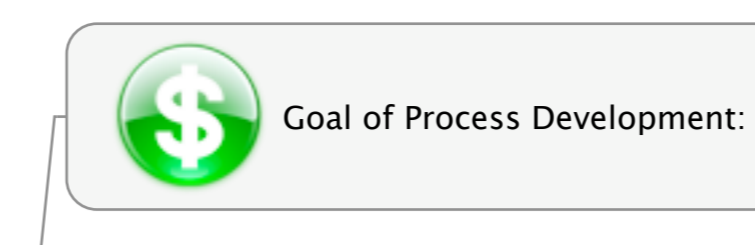


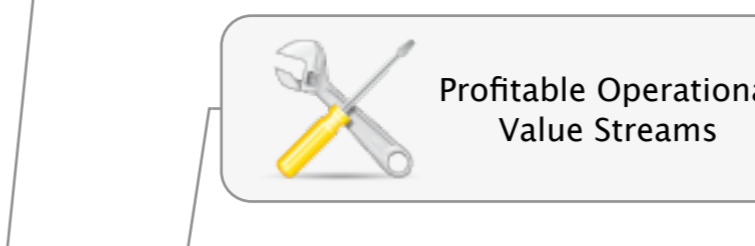
Update Constantly to Stay Current with Market Demand  
Use the Plan to Forecast Capacity  
Stagger Product Introductions to Level Resources  
Toyota has a 10+ Year Plan



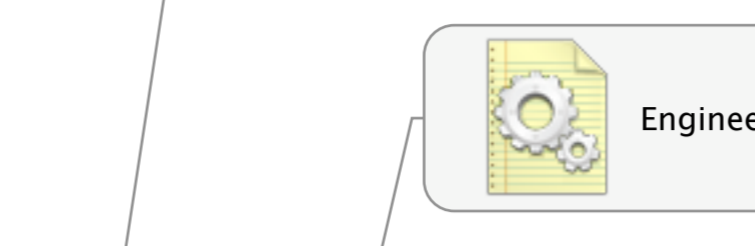
# Lean Process Development



Design Products/Projects that Consistently Generate Profit  
Operational Value Streams are What Makes Profit  
Process Development Rate & Quality Depend on Knowledge



Processing Systems  
Usable Knowledge  
Success is Profitability  
Define Profitability: Least Life-Cycle Cost  
High Quality & Low Cost  
Success is Speed  
Success is Getting Knowledge to the Right People at the Right Time



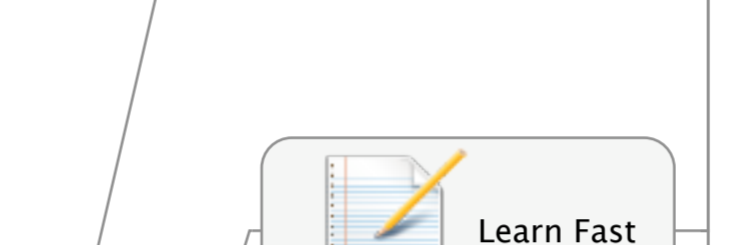
Operations Support  
Project Support  
Move People Back & Forth  
Creates a Learning Environment  
Look  
In Situ Observation  
Ask Why  
Model  
Discuss  
Act



Value-Creating Cycle - LAMDA  
Value Streams - What Customers Want  
Create Information Fields - Visual & Accessed Easily by Anyone  
Avoid Large Batches of Information (Writing All Specifications Up Front)  
Work on Every Aspect of the Design Every Week (Collaboration Meetings on a Regular Cycle)  
People Need Time to Actively Participate in the Work Cycle  
Big Blocks are Made Up of Smaller Blocks  
Work Concurrently and Capture Knowledge in Trade-off Curves  
Use SBCE  
Use Timeline Maps to See Waste in the Cycle - Especially Waiting



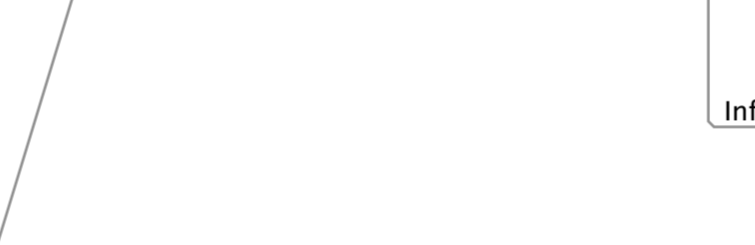
Resources Belong to Two Groups: Project Team, Their Discipline Specialists  
Put Resources on a Rotating Cycle that Supports Every Assigned Project Twice a Week  
Standardize & Post the Meeting Times  
The Meeting Can be a Net Meeting  
Make All Information Accessible Electronically, Everywhere  
Set Up a War Room for the Team to Meet in



Find Information: With a Few Key Strokes, A Short Walk  
Single Responsible Owner for Every Piece of Information  
Have Only One Place for a Particular Kind of Knowledge  
May Have Several Contributors  
Have Only One Copy of the Information  
Users are Responsible to Pull the Information  
Users Check on a Regular Basis  
Or Users are Automatically Notified of Changes  
Keep Documents Short - Provide Links to Back-up Documents  
Changes are Easily Recognized: Highlight, Lines in Margin, etc.  
Remove Change Markings on a Standard Time, so People Know How Often to Check  
Priorities for Software are Ease of Use & Reliability  
Software Should Support People/Processes  
People Have First Say, Not IT Dept  
Engineers Need to Sketch & Draw  
Hold Regular Town-Hall Meetings to Talk About Software & Knowledge Organization



Physical Distance  
Incompatible Computer Formats  
Social  
Dept Silos  
Communication Barriers  
Poor Skills  
Not Turning Data into Usable Knowledge  
Teach Eng to Draw  
CAD is a Tool, Not a Career  
Information Channels  
Push instead of Pull  
Electronic DB People can draw from as needed  
Right Knowledge Doesn't Get to the Right Place  
Turn Data into Usable Knowledge  
Standardization thru Value Focus  
Use What Works to Increase Value  
Useless Information  
Not Readily Available When Needed  
Doesn't Add Value  
Doesn't Innovate  
Doesn't Provide Basis for Good Decisions  
People Making Decisions & Doing the Work Do Not have the Required Knowledge  
Separate: Knowledge, Responsibility, Action & Feedback  
Results from Sequence Steps  
Causes Variations in Work Load  
Batch Learning, Resulting in One-Way Communication Channel  
Waiting  
Reduce Waiting by Pull, Flow & Cadence  
The Goal is to have Everyone Plan their Own Work  
This Allows SBCE



Integration Learning: Customers, Suppliers, Physical Environment  
Innovation Learning: New Solutions  
Feasibility Learning: Makes Better Decisions from New Solutions  
Test to Failure, So You Know Where the Limit is for that Technology  
Not Just Pass/Fail Testing Because This Does Not Increase Learning as Much  
Picture of Part/Process  
Analysis of the Cause  
Possible Counter Measures  
Graph - Conditions Where Failure Occurs  
Graph is the Key  
Data in Visual Form = Usable Knowledge  
Ask: What are the Fundamental Trade-offs with a Particular System?  
Use this to Quickly Eliminate Weak Alternatives  
Form May Need to Adapt to Each Particular Industry  
Use What is in Existence and Build on it.



Use Semi-Standard One-Page Forms  
Provide Big Picture & Make References to Details  
Trade-Off Curves  
Problem-Solving Sheet  
Focus on Essential Facts & Logic  
Engineers Must Draw, So Give Them Tools & Teach Them  
Equations are Important - Ask to See Them  
Conduct Efficient Meetings  
Meetings are For Resolving Confusion & Conflict  
Always Surface Conflict - It is What Makes Great Designs  
Conduct Win-Win Negotiations  
Focus on Fact & Logic  
Go See, Ask Why  
Information Should be Communicated Through Durable, One-Page, Living, Electronic Documents



Test to Failure, So You Know Where the Limit is for that Technology  
Not Just Pass/Fail Testing Because This Does Not Increase Learning as Much  
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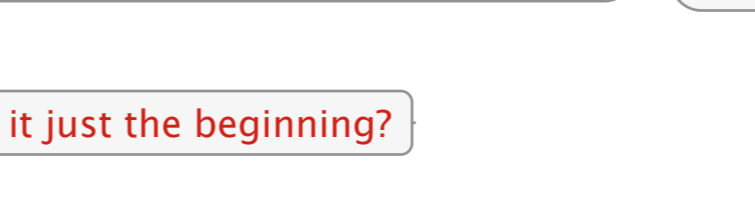
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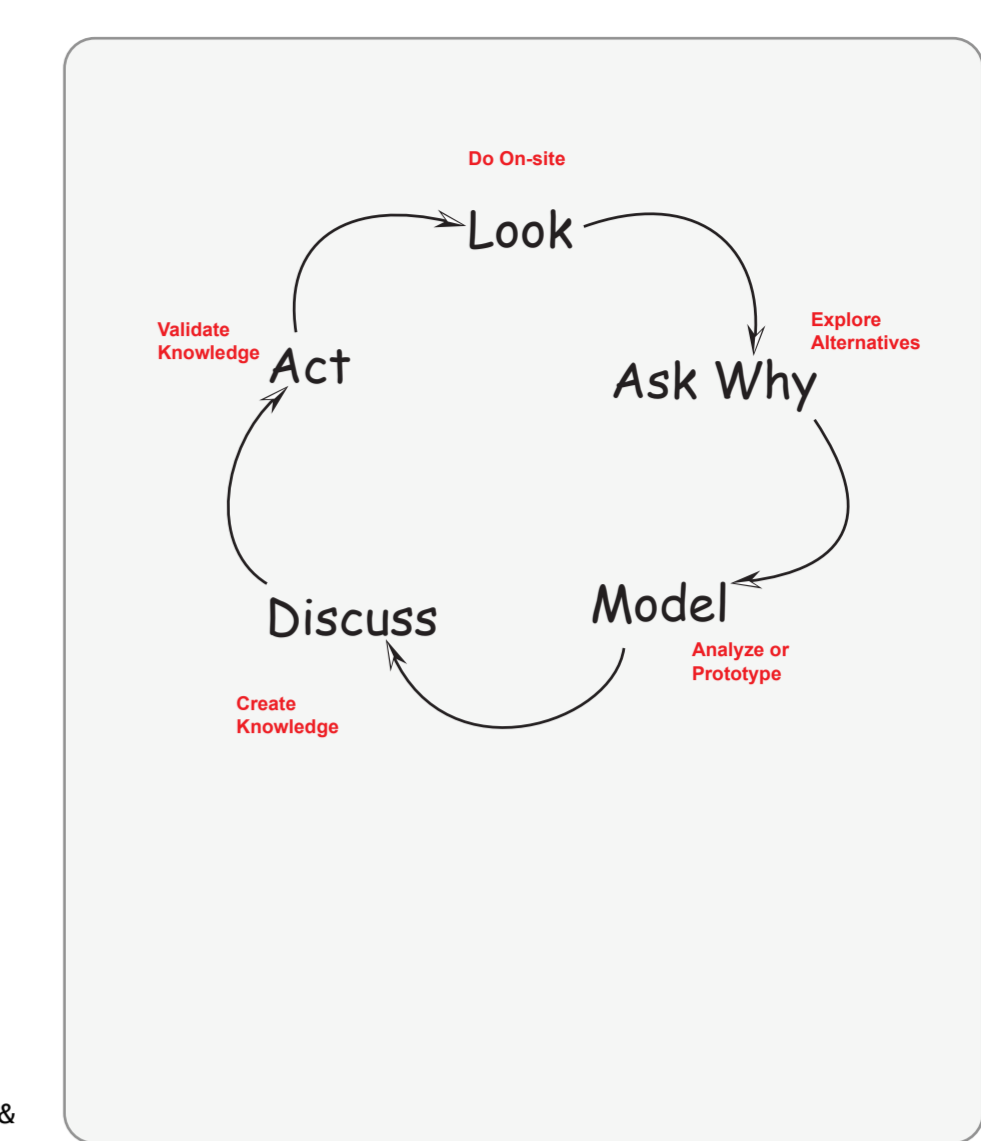
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Perfection is not attainable, but if we pursue perfection, we can catch excellence. - Vince Lombardi

THE END - or is it just the beginning?