Our LPPD Journey

Visual Management and Innovation

key success factors, barriers to excellence

Dan Caputo – *New Product Development and Technology Strategy*

LPPDE Virtual Summit

July 6, 2023

VM – implementing a working system

- Intro and context 10 min
- Visual Management system 5 min
- Key success factors and obstacles 20 min
  - Tying Program goals and objectives to the Business
  - The Functional Block Diagram
  - Leaderboard and “help-chain”
- Summary 5 min

Background

- Over 35 years doing all things NPI-related as engineer and manager
  - IBM (Disk Drives) and HP Inc (Printers) *
  - R&D, Industrial Design, Program Management, Mfg Engineering, Procurement, Operations
  - Extensive technology and product development, but also global manufacturing (e.g. bringing up new production in Germany, Italy, Malaysia and Thailand), Procurement commodity and supplier quality strategies, etc.
- For many years, my passion was in technology asset development and new product creation.
  - Large Format and All-in-One product lines, HP Inc, San Diego, CA
- More recently became an executive (10 years) responsible for Inkjet products technology strategy
- Known for creating methods and process frameworks that became our organization's Best Practices that consistently achieved better results.

* Now weeks into semi-retirement!

Context – HP Inc [1]

- A leading global provider of personal computing and other access devices, imaging and printing products, and related technologies, solutions and services for business and home.
  - **Personal Systems**: desktop and notebook PCs for consumer and commercial markets
  - **Printing**: printer hardware, supplies, services and solutions for consumer and commercial markets
- 58,000 employees [2]
- FY22 total revenue ($US) [3] $63B
  - Notebook computers $29B
  - Desktop computers $11B
  - Printer supplies $12B
  - Consumer printers $3B
  - Commercial printers $4B

4

1 HP Inc. Fiscal 2022 Annual Report (Form 10-K). U.S. Securities and Exchange Commission. December 6, 2022
2 Includes recent Poly acquisition
3 All values rounded to nearest $B
4 My operating arena was Inkjet and Laser Printing products and supplies which represent a large portion of these revenue values

Lean history at HP – two significant engagements with LPPD

2004-2005 Engagement with Allen Ward/Durward Sobek

- Inkjet Printer and Inkjet Technology teams
- Producing millions of low-cost inkjet printers for consumers and SMB customers
- "Technology sold the printer"
- Wanted to maintain strong core while shifting resources to other innovation areas

Lean focus

- Knowledge Based Design (KBD)
  - knowledge creation, visible knowledge, trade-off curves, asset development…
- Apply to R&D
- R&D reorg based on Asset/KBD
  - Strong Sr. Leadership support for knowledge creation initially
  - But "Let's just get the product out the door!" eventually prevailed
  - However, R&D retained strong base of KBD culture – strong asset focus and core principles about knowledge and design margin persisted throughout R&D thanks to individual efforts of Lean champions.

2019-2022 Engagement with Argo Consulting

- Producing millions of printers, but technology no longer core differentiator
- Sr. Leadership changeover (multiple rounds): Fewer execs have technical development background… "no more new technology needed."
- Less planning rigor applied to longer innovation cycles, belief that any development, any innovation can be slotted into available time.
- Technical experience drain over the years
- Incomplete customer insights in the new, "non-technology-led" era
- Transformation Office initiative… Inkjet Printer team engages

Lean focus

- 7+1 Principles, intend to apply to whole (Inkjet) business
- Timeline
  - Early 2019 – VM pilots start; Program Obeya boards in use by summer
  - July 2019 – acquired Business Executive VP sponsorship (yay!)
  - August 2019 – major reorg, Business Executive sponsorship lost
  - March 2020 – pandemic declared, workforce becomes virtual
- Despite conditions, created multi-year plan and begin to execute certain elements
  - i.e. from inside R&D/Program Management outward
  - Establish a beachhead, demonstrate benefits, and expand from there
- Net result: large gains in some areas, limited progress in others
  - Major emphasis on Visual Management

VM System

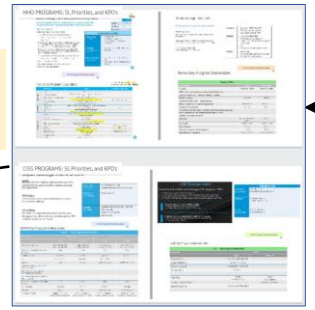
Three key elements of the overall VM System

Starting with Compass Mgmt system (e.g. Hoshin Kanri, Northstar, series of cascading objectives, etc.), connect Program Goals and Objectives to the Business

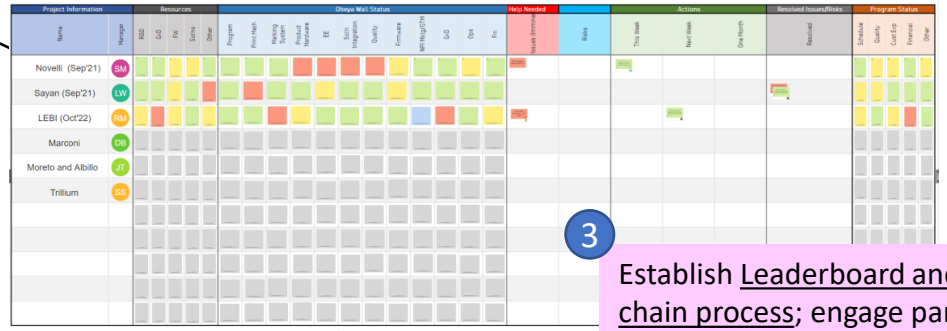
1

Business Unit Goals and Objectives

Program Goals and Objectives



Leadership Board– single-page view of all programs

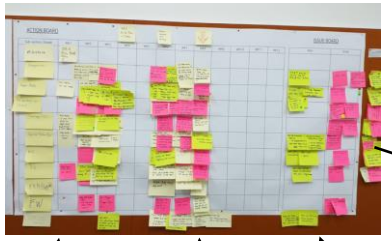


3

Establish Leaderboard and help-chain process; engage partners to get buy-in to the process.

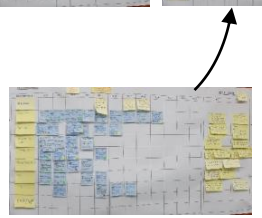
Actions

Program A – Obeya board



2

Create Program Obeya room; establish Obeya team structure based on Functional Block Diagram and other Program risk areas



Sub-system and Asset Sub-Boards

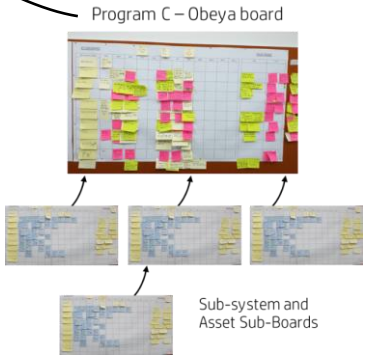
Help needed – risks and issues

Help needed – risks and issues

Program B – Obeya board

Sub-system and Asset Sub-Boards

Program C – Obeya board



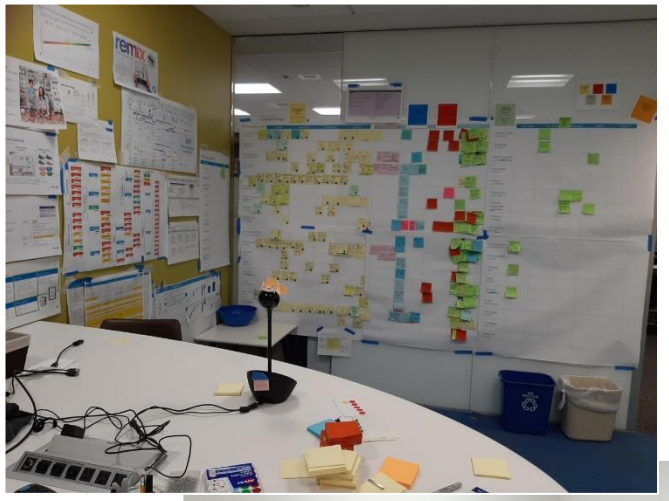
Sub-system and Asset Sub-Boards

The VM connection to *Operational Excellence* is direct

VM: **SEE** together, **KNOW** together, **ACT** together

- Visualize the work, see the issues
  - *"go to the Obeya" for discussions*
- Collaborate for faster issue resolution
  - *identify interdependencies and interactions*
  - *coordination "at the board"*
- Help-chains to remove barriers, unblock teams
  - *clear accountability for problems, escalation, and resolution*
  - *gain efficiency*

Obeya = large room

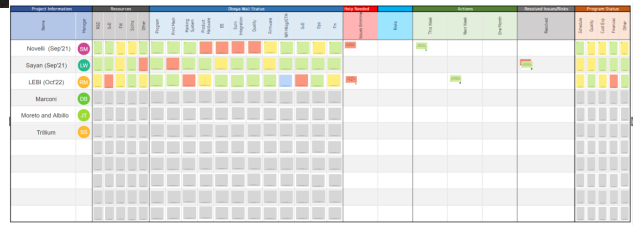


VM plays a crucial role for *Innovation* too

Customer and market information

Innovation investigation actions

Innovation efforts Leaderboard



VM : **SEE** together, **KNOW** together, **ACT** together

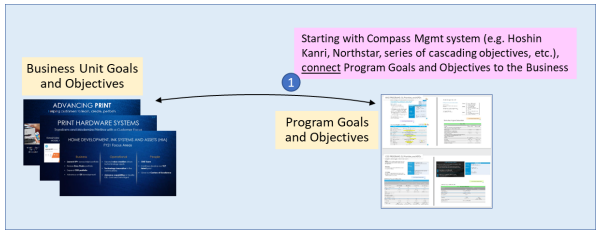
- Visualize the work, see the **intent**
  - *"go to the Obeya" for discussions*
- Collaborate for **better understanding and coordination**
  - *identify interdependencies and interactions*
  - *better understanding, dialogue, and coordination of actions "at the board"*
- Help-chains to remove barriers, **gain support**
  - *clear accountability for priorities, tradeoffs, and action plans*

VM impact on Innovation: it changes your lens, changes your discipline, and super-charges other principles

VM element #1

Tying Program goals and objectives to the Business

Tying Program goals and objectives to the Business

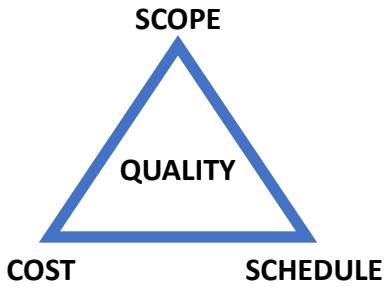


1. STRATEGIC INTENT and BUSINESS PRIORITIES MATRIX

   Pre-Program/Early in Program

   a. Strategic Intent: what is the product's "purpose for being" in the market, for the customer, and for the Business

   b. Business Priorities (flexibility) matrix: identify what strategic elements are least flexible (constrain), have some flexibility (optimize), and are most flexible (accept). (Approx. 7-10 items – keep it strategic)



2. KEY PROGRAM DELIVERABLES

   By the end of definition phase

   - ~20-ish product definition items that best describe the strategic definition of the product. (Each item has a target and threshold.)

Why is this **critical**?

- Activates entire organization to internalize strategic purpose and understand the key, strategic elements of the product. Creates shared goals.
- *Every* Program discussion comes back to these things.

Tying Program goals and objectives to the business

Obstacles encountered:

- Abuse of Strategic Intent/Business Priority matrix
- Silo behavior, escalations and mandates

Barrier to excellence:

- Silo objectives and reward culture

What this looked like:

- VP's favorite Product Definition items disguised as strategic statements
- The team's work being overridden by organizations jockeying for position in the Business Priority matrix and overloading the LEAST FLEXIBLE bucket
- Not having the discipline to identify what is MOST FLEXIBLE (No tradeoffs allowed!)

IWWIWWIWI!

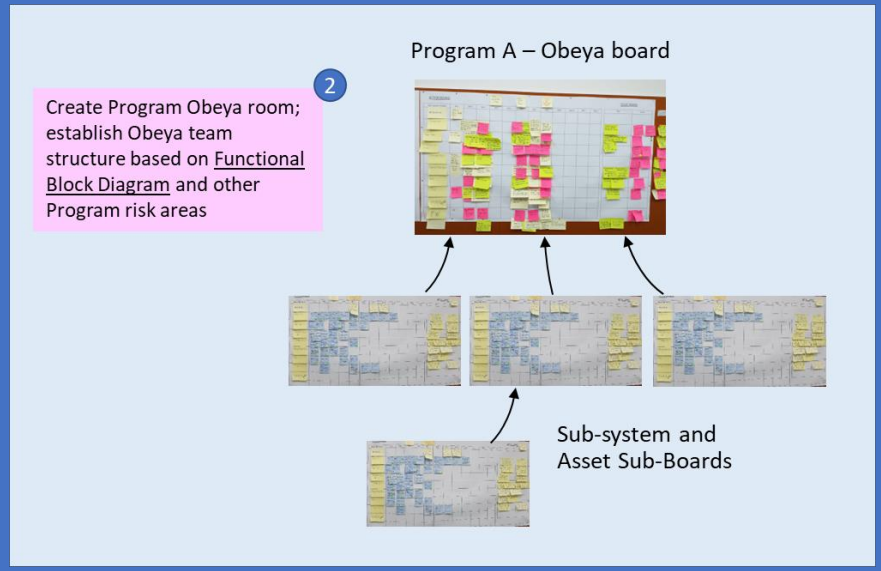
Which leads to:

- Lack of clarity – no discernment of what's really important, "I want it all!"
- Team disempowerment – are they shared goals anymore?
- Disengagement – "Work extra hard with partners to do something outstanding? I don't think so!"

our score: 4 → 6.5

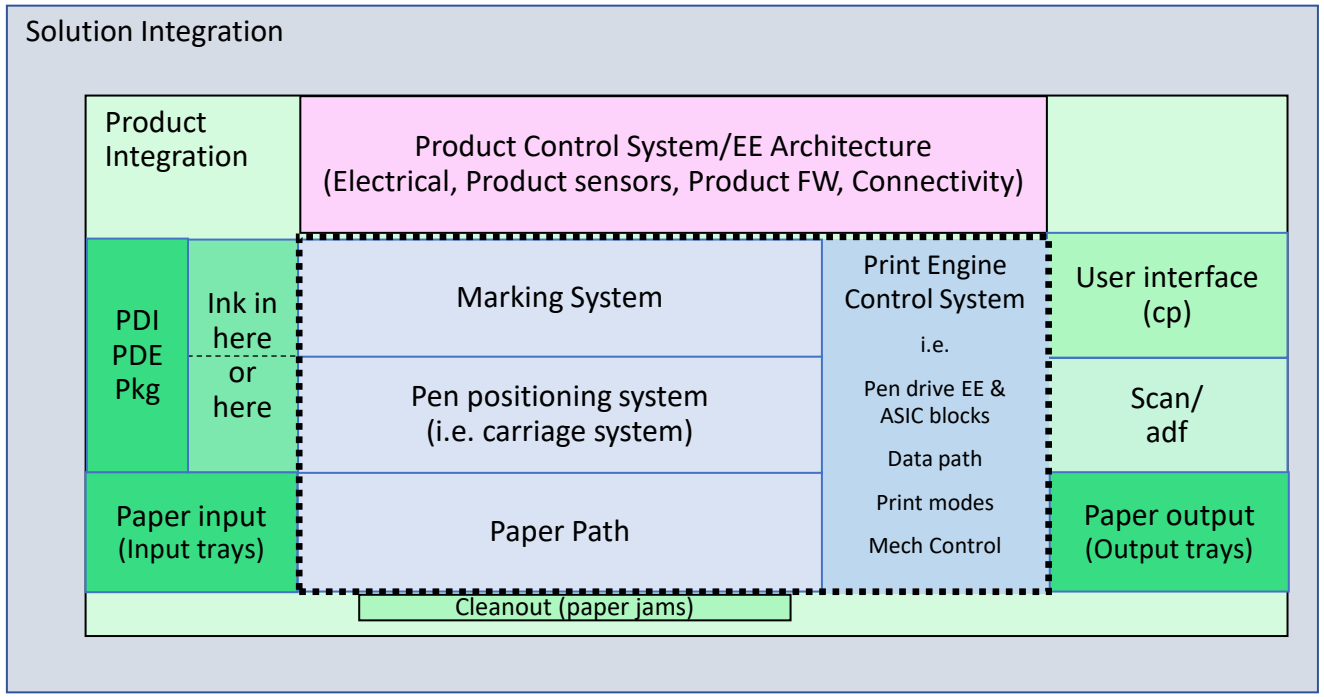
VM element #2

The Functional Block Diagram



Functional Block Diagram - the starting point

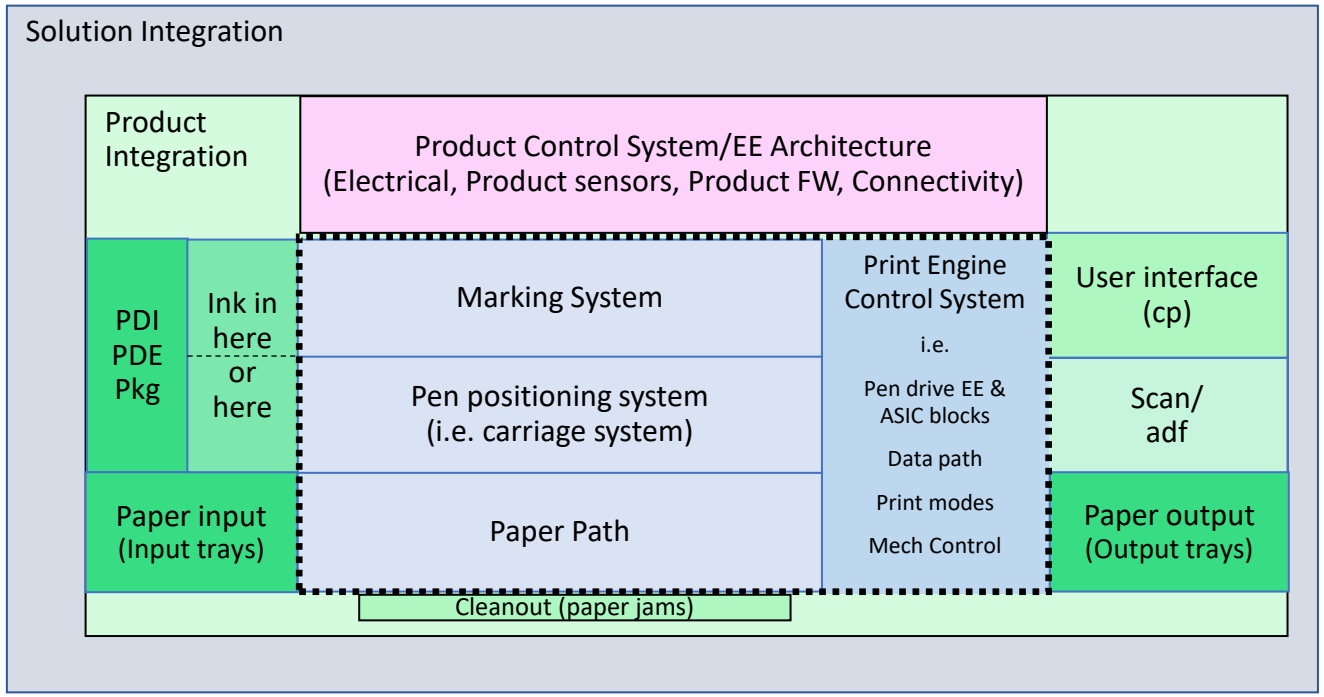
System representation of product



- From an <u>end-user perspective</u>, what are the functions the product needs to perform to do what it's supposed to do.
- Identify the highest complexity technology areas. Determine system and subsystem elements.
- Build a product map by system. Where are the seams and interactions? Where are their dependencies? What is independent? Iterate.
- Assign functional and customer performance specs to the lowest subsystem possible that can actuate the goal.
- What are the more complex, derived system performance specs? Where are they best assigned? To a specific system? To the top-level Product?

Printer Functional Block Diagram

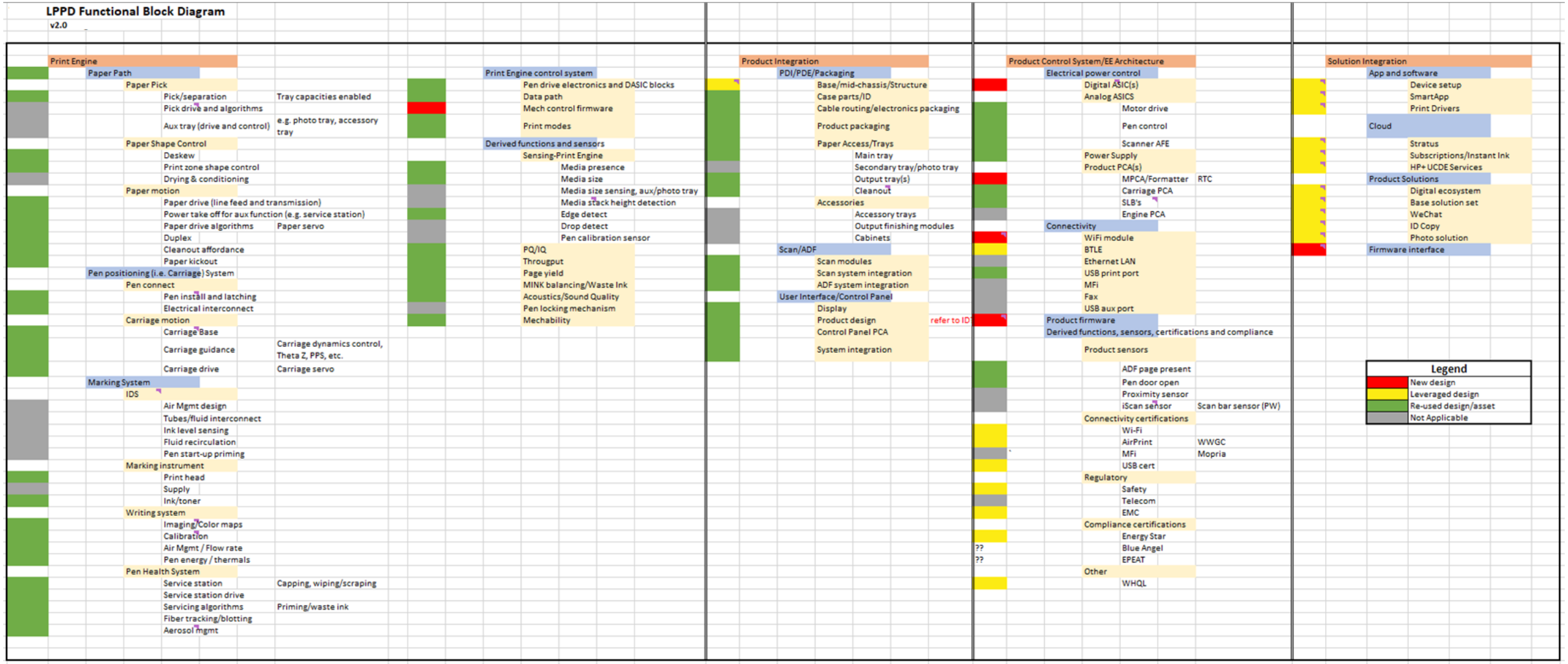
Customer-centric performance expectations become front-and-center



- There is no one perfect representation – create one that makes the most sense to you. Iterate over time.
- Focus on end-user value and customer-centric performance
- Having a good FBD does two things:
  1. Visualize development scope, risk, and innovation areas
  2. Focuses the dialogue, enables the work in most customer-centric manner.
     (Informs the structure of team forums and Obeya boards, thereby enabling the teams to have the right dialogue at the right place.)

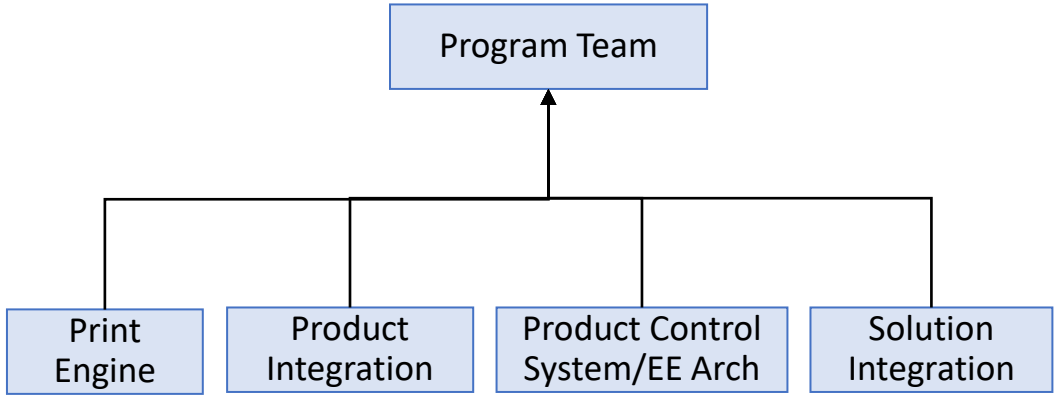
1. FBD used to visualize development scope and risk

High-level view of reused/leveraged/new design elements; where are the areas of innovation or risk?

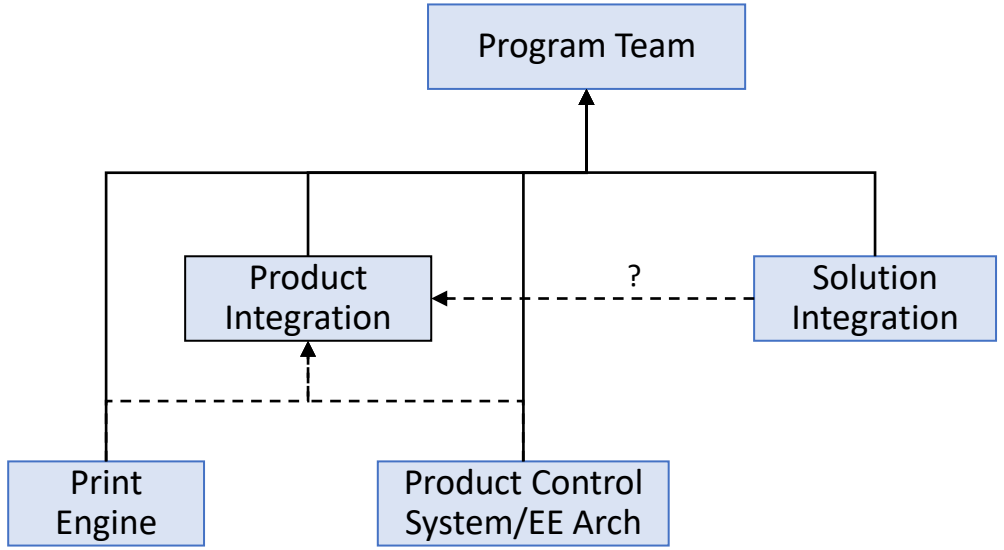


2. FBD ~~determines~~ *informs* the structure of the team forums

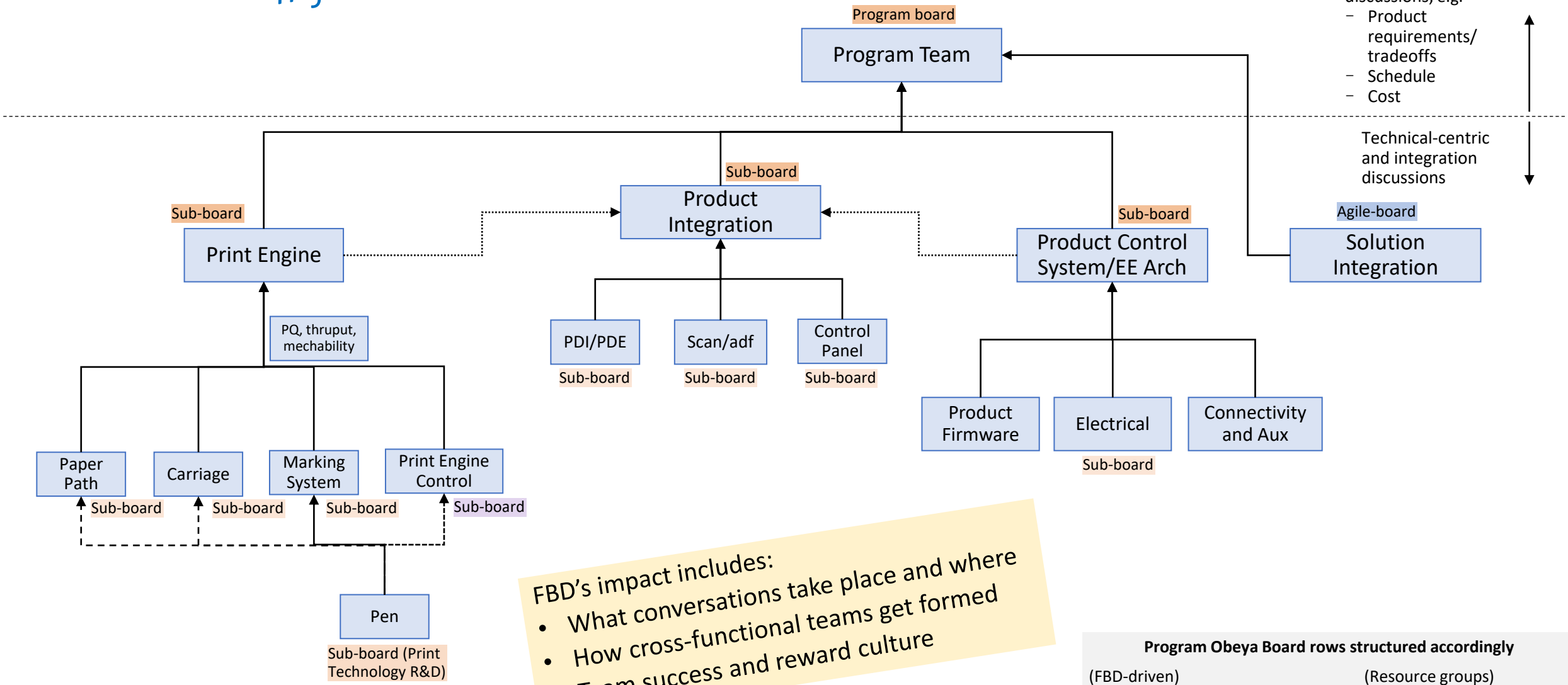
1st-pass



As implemented



2. FBD *informs* the structure of the team forums



FBD's impact includes:

- What conversations take place and where
- How cross-functional teams get formed
- Team success and reward culture

Sub-board = required

Sub-board = optional; required if high level of newness/scope

Program Obeya Board rows structured accordingly

(FBD-driven)

1. Program
2. Product Integration
3. Pen
4. Print Engine
5. Product control sys/EE arch
6. Solution integration

(Resource groups)

7. Marketing
8. Design – ID/Ux
9. FW
10. Quality
11. Operations
12. Finance

The Functional Block Diagram

Obstacles encountered:

- Buy-in to FBD-based accountability, forming teams accordingly (i.e. not by engineering discipline or org structure)
- Full FBD-engagement by partner organizations

What this looks like:

- Many resource-oriented forums based on org structure
  - People get comfortable working by engineering discipline and don't think they need to change
  - "Us-them" thinking; we do "our" work, they do "theirs"
- Status review meetings by discipline or organization
  - Many review meetings by discipline/organization to "get a handle on what my team is doing"
  - Reinforces the "my team delivered; get the other team to fix their problems" mindset
- System discussions and decisions take place only at higher levels; Partners engage only at those levels.
  - 40-50+ people at (long, 2+ hours) Program Team meetings, because "that's where all the important discussions and decisions occur."

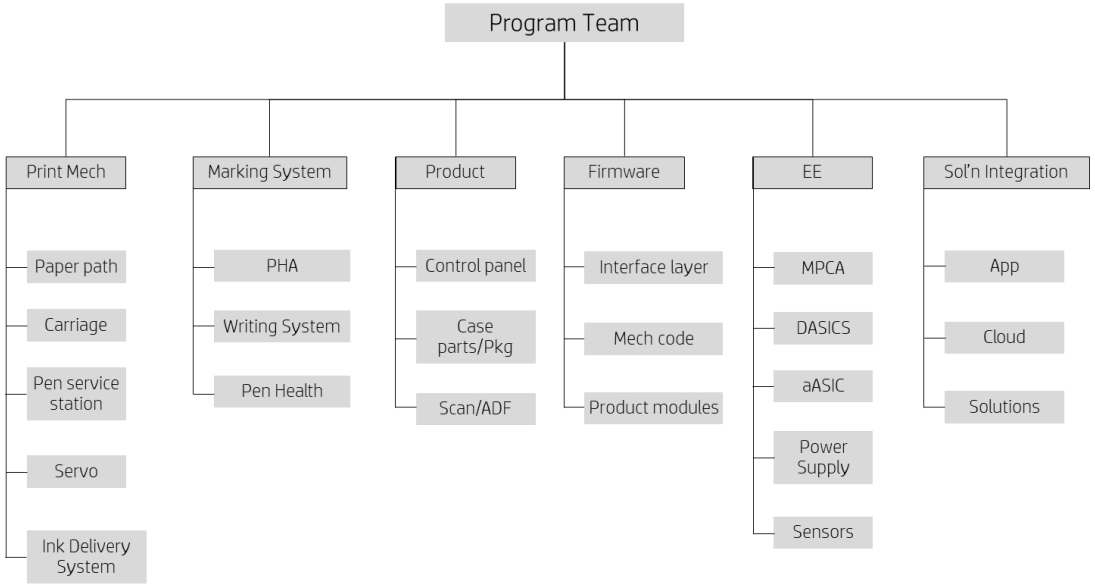
Which leads to:

- Sub-optimum, incremental innovations at resource level
- Lost opportunity for more effective, customer-centric innovation

FBD makes for more effective innovation

Resource-oriented

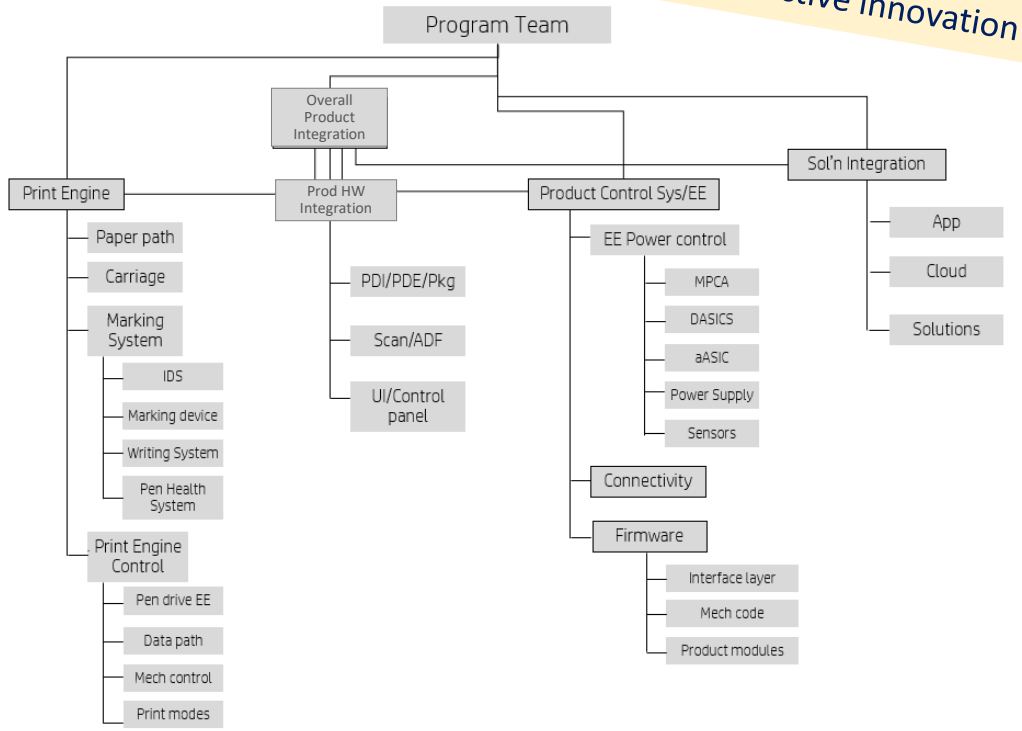
- Partial, incomplete resource-oriented innovation efforts
- Many arcs of discussion to drive innovation, decision-making, and issue resolution
  - Innovations tend to become more narrow, take longer
- Integration point is at top-level Program Team
  - 40-50+ people to listen/engage in decision discussions
  - Barriers erected, further escalations occur regularly



FBD-based

- Small groups with the right cross-functional members all along the way
- Customer-focused innovation, tradeoff discussions, and decision-making funneled to the right subsystem team
- Program Team focuses on highest Program-level tradeoffs and business decisions

Focusing on customer-centric outcomes leads to more effective innovation



The Functional Block Diagram

Barrier to excellence:
- Empowering subsystem/system teams

Obstacles encountered:

- Buy-in to FBD-based accountability, forming teams accordingly (i.e. not by engineering discipline or org structure)
- Full FBD-engagement by partner organizations

What this looks like:

- Many resource-oriented forums based on org structure.
  - People more comfortable working by engineering discipline – "We don't need to change how we do things."
  - Contributes to "us-them" thinking. Desire to get "our" work done before inviting others in, lowering the complexity to finish "our" work.
- Status review meetings by discipline or organization
  - Many review meetings by discipline/organization to "get a handle on what my team is doing"
  - Reinforces the "my team delivered; get the other team to fix their problems" mindset
- System discussions and decisions take place only at higher levels; Partners engage only at those levels.
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Which leads to:

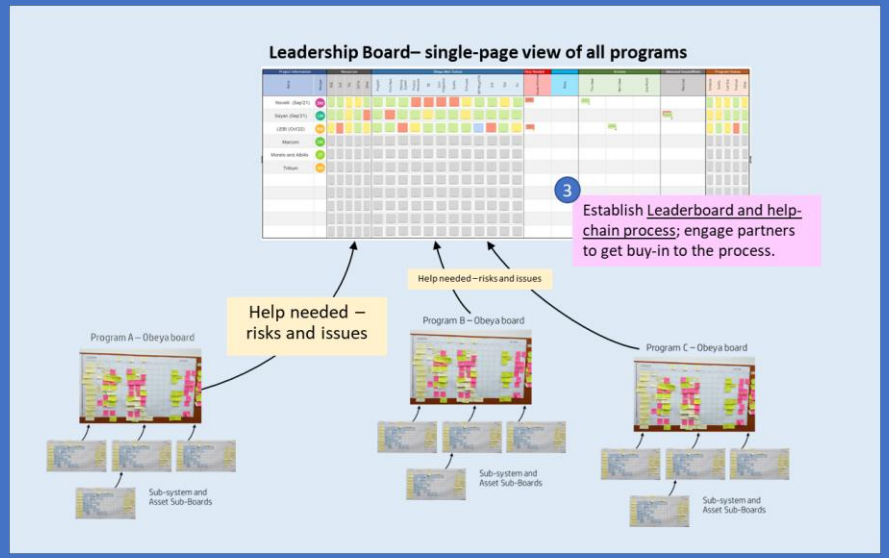
- Sub-optimum, narrower innovations at resource level
- Lost opportunity for more effective, customer-centric innovation

our scores

- use of FBD: 5 → 7
- empowerment: 3 → 4

VM element #3

Leaderboard and "help-chain"

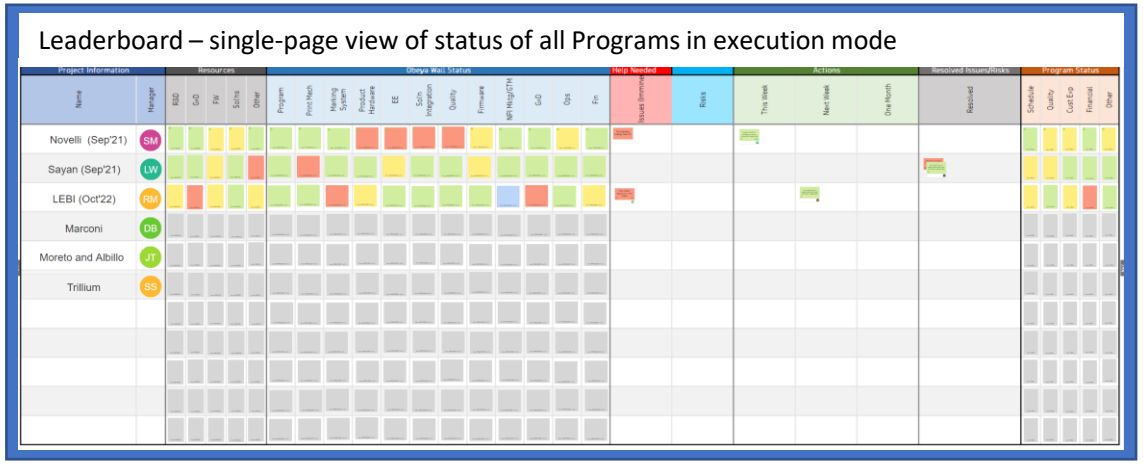


The Program Leaderboard – overview

Remove barriers, unblock the team

- Single-page view of all Program Obeya status
- Short (< 30 min) weekly meeting with Directors from all functions and partners
- Program Manager articulates where team is blocked to meet next integration milestone (~ 2-3 months)
- Specific help is asked for. Directors are empowered to take action.
- Action and/or decisions expected within one week, occasionally two.

Leaderboard – single-page view of status of all Programs in execution mode



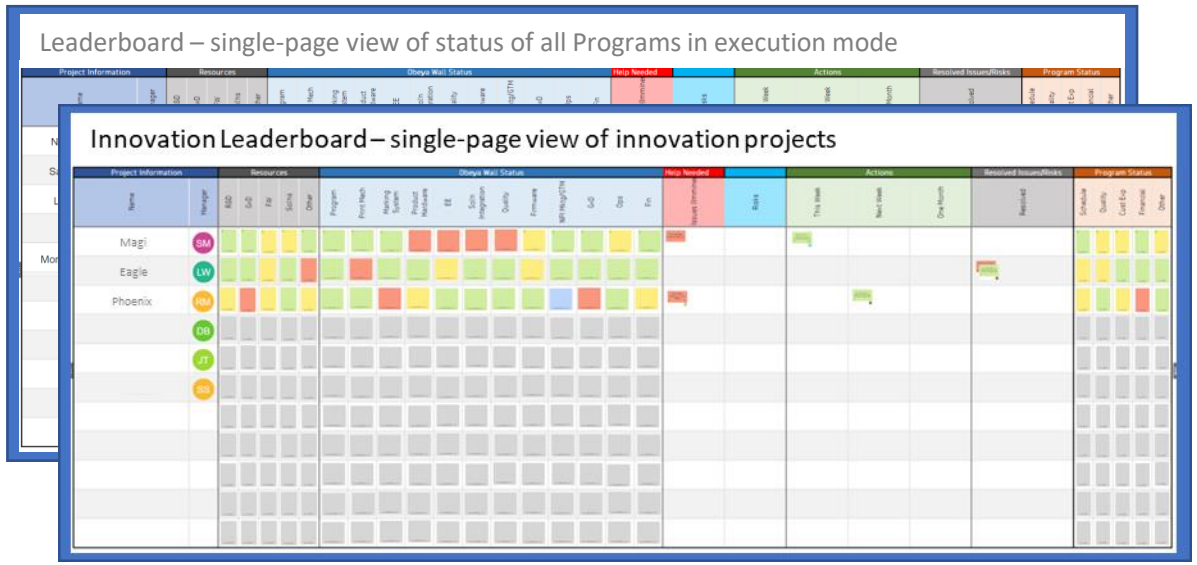
Direct connection to Operational Excellence

Introducing the Innovation Leaderboard

Under construction, pilot tbd

The idea: early innovation efforts cannot be covered well in the normal Program Leaderboard process. Therefore, create an Innovation-focused one to create traction and pull, remove barriers, and focus the effort.

- Single-page view of all pre-Program and off-cycle Innovation Projects status
- Short-ish (< 1 hour) weekly (bi-weekly?) meeting with Directors from all *necessary* functions and partners
- Project lead articulates where team is blocked to meet next "demonstrate" milestone (~ 2 months)
- Specific help is asked for. Directors are empowered to take action.
- Action and/or decisions expected within a few weeks.



The Leaderboard and Help-Chain

Barrier to excellence:
- Empowering Directors

Obstacles encountered:

- Normalizing expected behaviors by Program Managers (e.g. what and how to escalate an issue) and by Directors (e.g. no interrogations, not pushing the problem back onto the team)
- Establishing credibility in the Leaderboard process, eliminating need for other types of review meetings
- Getting all partners to engage, and empowering Directors to make decisions

What this looks like:

- Many off-cycle review meetings; also, preview meetings to avoid surprises at the Leaderboard or to "set the stage" politically
- "Asking 20 questions" to interrogate, refute the issue, or push the issue back onto the team
- Erecting high-overhead hurdles for the team before actioning.

Which leads to:

- Unempowered Leaderboard meeting (which then eventually disbands)
- Not wanting to bring up issues because of burden placed on Program Manager/team
- Reverting to a series of less-effective review meetings – high overhead and slow!

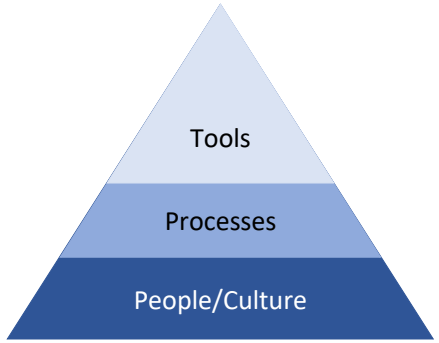
our scores

- Programs: 2 → 6.5
- Innovation: *not yet started*

Summary

Visual Management is a vital part of the Innovation process

- VM is as crucial to Innovation as it is to Operational Excellence
  - Becomes the eyes and ears of the Innovation process
  - It changes the lens, changes the discipline of the entire organization



- All three elements of the VM system needed for best results
  - Connect entire team and organization to strategic pieces and create shared purpose
  - Focus team on end-user and customer-centric performance targets via FBD-based action
  - Create pull, maintain momentum, and get the support you need from Leadership

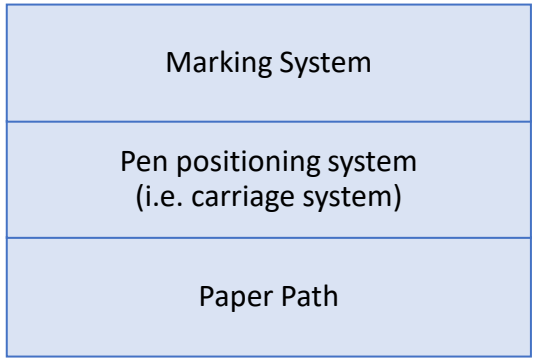
- Systemic barriers are ever-present; it takes time, effort, and diligence to achieve excellence
  - Management ecosystem: Command-and-Control → Lean & Agile Leadership behaviors
  - Sponsorship at the right level

Thank You!

Reference and backup

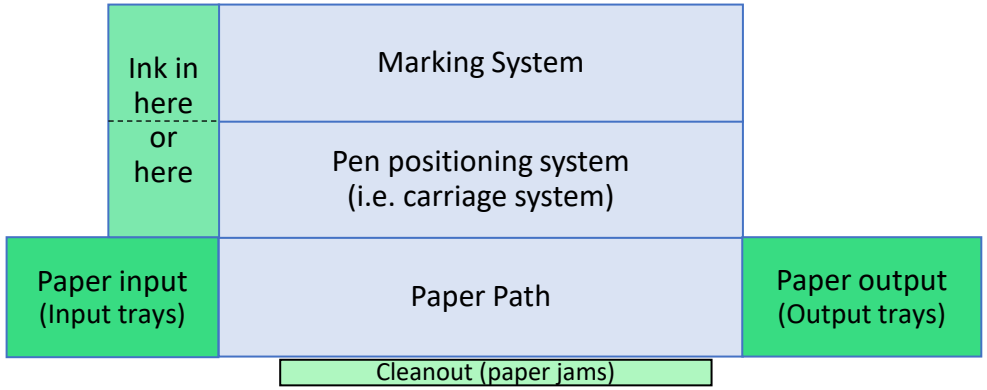
FBD build-up

FBD build-up



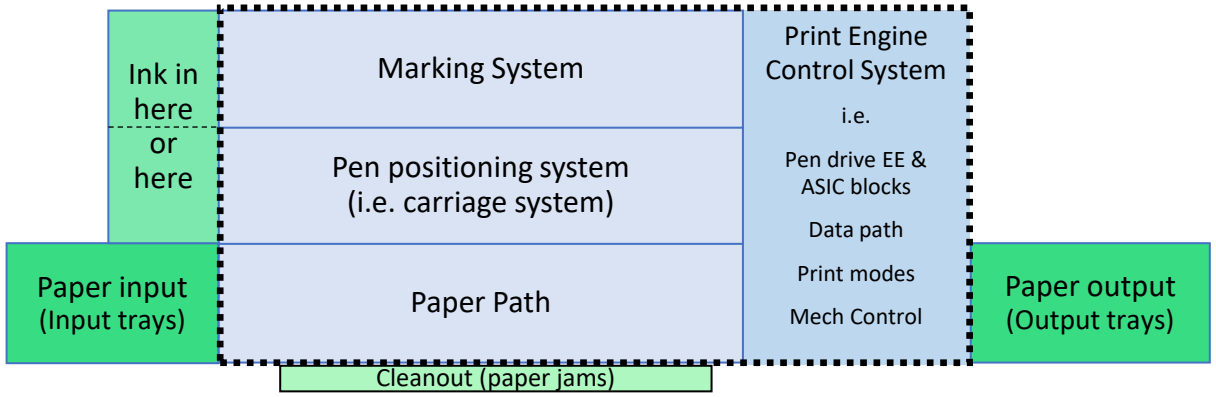
- Start with the three basic systems of the Print Engine

FBD build-up



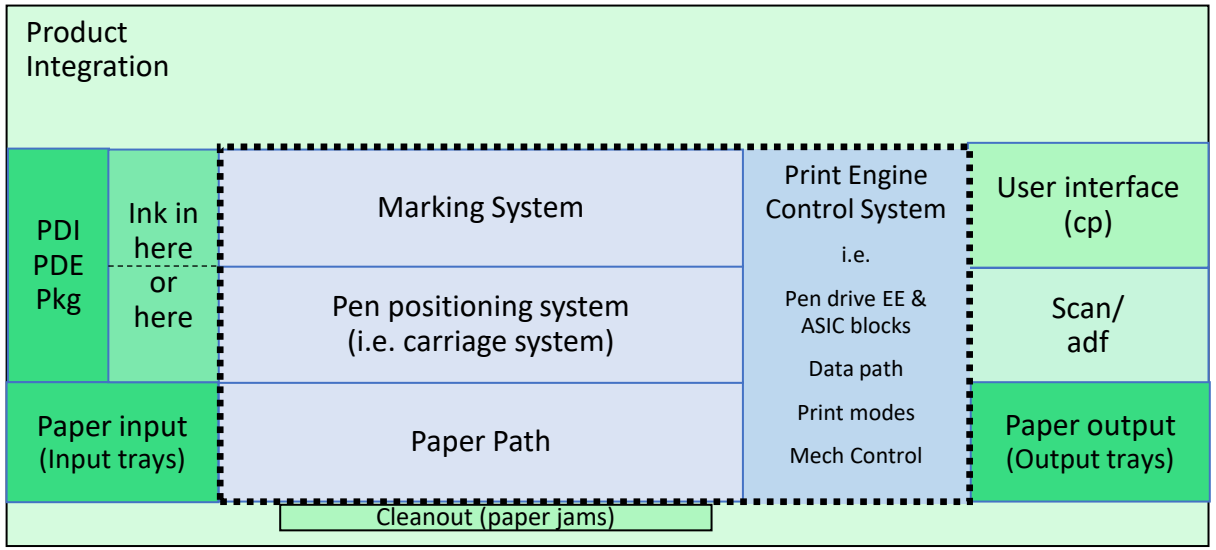
- Start with the three basic systems of the Print Engine
- Add elements, identify seams between systems

FBD build-up



- Start with the three basic systems of the Print Engine
- Add elements, identify seams between systems
- Add missing Print Engine Control System element

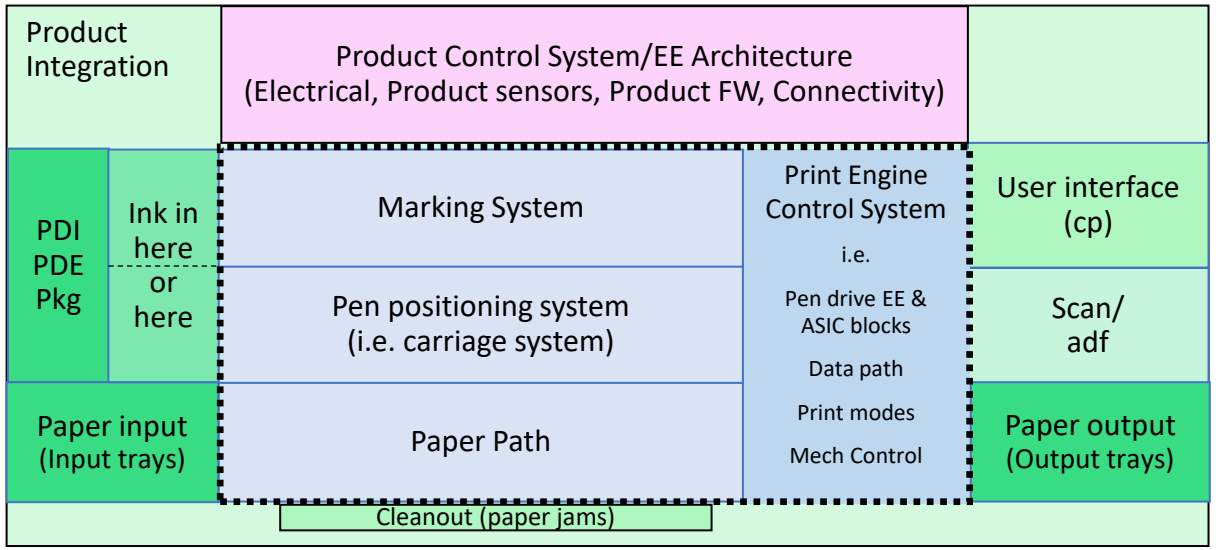
FBD build-up



- Start with the three basic systems of the Print Engine
- Add elements, identify seams between systems
- Add missing Print Engine Control System element
- Build further

Print Engine

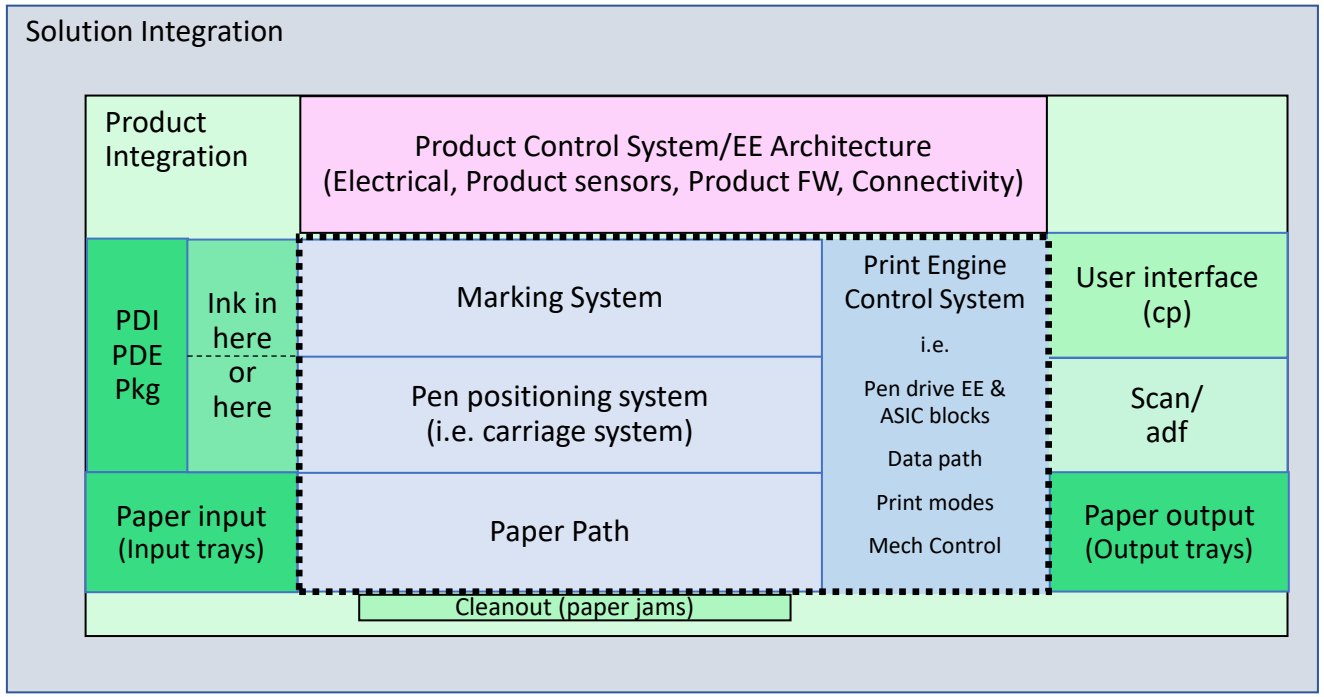
FBD build-up



- Start with the three basic systems of the Print Engine
- Add elements, identify seams between systems
- Add missing Print Engine Control System element
- Build further
- Add overall Product Control System

Print Engine

FBD build-up



- Start with the three basic systems of the Print Engine
- Add elements, identify seams between systems
- Add missing Print Engine Control System element
- Build further
- Add overall Product Control System
- Add Software Solutions