Business Architecture Guild – Sample Manufacturing Scenario

Scenario 1: Production Cycle Time Reduction

Introduction

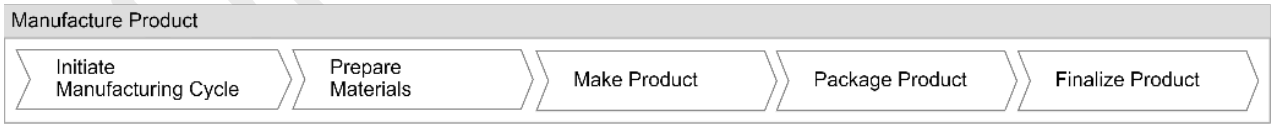
Immediately following a leadership sponsored product strategy meeting for one of the key manufacturing plants, the Operations Manager contacted the Business Architect who supports production. There had been several rounds of discussion at the strategy meeting concerning an uptick in customer demands occurring at the same time as a shortfall in production flow. One of the strategic objectives for the company is to reduce production cycle times through increased workflow and automation. This manufacturing plant appeared to have several improvement opportunities. The operations manager wants to find ways to reduce production cycle times for high demand products with low production rates.

The Business Architect knows that properly engaging relevant subject matter experts will be critical to the success of the endeavor. They have in-depth knowledge about the operations and processes, have experienced the pain points, know what work is done and why, experienced past attempts at improvement, and are critical advocates for any proposed solutions to be effective.

The plant has an extensive list of personnel, but starting with that alone would not be practical. Based on the high-level strategic objective description, the business architect has some understanding of where to focus for this effort – the value stream. Business value, the "why" of the organization, is reflected in the business architecture value streams, making the value stream a good place to start to identify those subject matter experts.

Value Based Focus

One of the most important value streams in the manufacturing setting, and the one at the heart of this scenario, is Manufacture Product. The manufacturing reference model establishes this value stream's value proposition as "Product assembled to requirements on time" and details the value stream stages of Initiate Manufacturing Cycle, Prepare Materials, Make Product, Package Product, and Finalize Product. The value stream is summarized in figure 3.1.1 and the value items are displayed beneath each stage.



Product manufacturing cycle underway	*Material ready for product assembly or processing*	*Product is assembled or processed*	*Product packaged for market*	*Product available*

Figure 3.1.1: Value Stream Representation

To tie the pieces together for a deeper analysis, the table in figure 3.1.2 depicts a summary of the value stream and stage-by-stage focus of scenario relevance, key information concepts and capabilities, and related stakeholders in a single chart. This chart provides a point of reference

for introducing and summarizing the scope and aspects of the scenario-based analysis to come. With the exception of column 3, the scenario focus, this information is drawn directly from the manufacturing reference model and establishes the context for the detailed analysis that follows.

Production Cycle Time Reduction				**Value Stream: Manufacture Product**	
Value Stream Stage Name	**Value Stream Stage Description**	**Scenario Stage Description**	**Key Information Concepts**	**Key Capabilities (see visual for Level 2)**	**Key Stakeholders**
Initiate Manufacturing Cycle	The act of planning for, and start of, a manufacturing cycle for products with sufficient similarity to be made together with relatively minor resource adjustments between instances.	The activities establishing the specific group of desired products and associated schedules, resources, work tasks and product matching needed to manufacture products.	Operation Work Asset Product Plan	Operation Management Work Management Asset Management Product Management Plan Management	Operations Manager Product Manager
Prepare Materials	The act of final movement and readying of material to prepare for the make product stage.	These activities pacing final readiness to make the product, including movement and validation of materials.	Operation Product Material Agreement	Operation Management Product Management Material Management Agreement Management	Operations Manager Inventory Controller Product Manager
Make Product	The act of making a final product that is not yet fully packaged, which can include multiple, parallel assembly, or mixing sequences.	The activities bringing all the variables together across assets, human resources, material, and product validation as captured in the operations plan.	Operation Asset Product Work Material	Operation Management Asset Management Product Management Work Management Material Management	Operations Manager Product Assembler Quality Reviewer
Package Product	The act of preparing a product for market, including trim, documentation, and other readiness.	The activities matching product to orders and packaging, final product validation, and scheduling later stages	Order Product Work	Order Management Product Management Work Management	Operations Manager Product Packager Quality Reviewer
Finalize Product	The act of finalizing a packaged product to be released for subsequent acquisition.	The activities matching product to shipping, notifying customer on delivery, and revising agreements as needed	Customer Agreement Shipment Route	Customer Management Agreement Management Shipment Management Route Management	Customer Manager Product Packager Inventory Controller

Figure 3.1.2. Value Stream Scenario Scope

The value stream identifies an initial group of triggering and participating stakeholders to consult. The Operations Manager, as the triggering stakeholder, is a knowledgeable subject matter expert and a crucial champion of the strategic objective to reduce production cycle times through increased workflow and automation. The participating stakeholders have similar roles in the effort. For this engagement, the business architect narrows down the manufacturing reference model's stakeholder list to the following:

- Operations Manager
- Product Manager
- Inventory Controller

- Product Assembler
- Quality Reviewer
- Product Packager
- Customer Manager

To identify individuals to interview, the analysis team cross-references list of stakeholders with the company personnel roster for additional details and assigned personnel. Setting up meetings with the stakeholders allows them to explain how best to approach for this engagement. During the meetings, the interviewer asks for if any additional stakeholders have insights to share and follows up with them.

Value Stream/Capability Cross-Mapping

The value stream scenario table shown in figure 3.1.2, which was derived from the manufacturing reference model value stream / capability cross-mapping, provides the basis for the capability focal points for this scenario.

Starting with this comprehensive capability overview, the business architect narrows the focus based on an understanding of the issues involved and targeted information concepts. The cross-mapping diagram, depicting key capabilities at multiple levels, is shown in figure 3.1.3. These capabilities represent the organization's ability to accrue value across this value stream, unrestricted by any one business unit and independent of any process, personnel, or technology implementation. This perspective enables a fundamental assessment of where capability gaps may need to be filled to deliver value across the value stream that scales across the ecosystem.

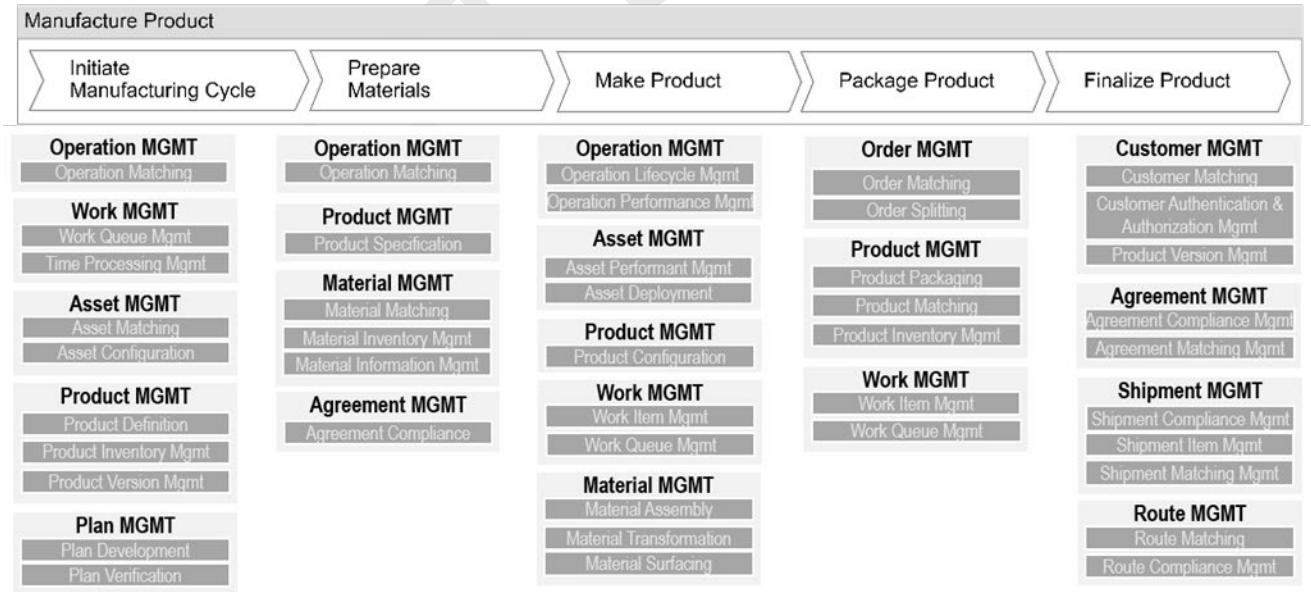


Figure 3.1.3: Value-Capability Cross-mapping

Information Analysis

As stakeholder discussions identifying, analyzing, prioritizing, and evaluating production issues

unfold, key terms raised are traced back to the information map for deeper analysis. Solutions are more effective if there is a common understanding of the most important business objects under review. This allows the business architect to narrow the wide-ranging information map in the reference model to initiative-specific information concerns, as depicted in figure 3.1.4.

Information Concept	Why relevant?
Agreement	Sets terms of for shipments and determines how orders are placed.
Asset	Asset refers to any kind of equipment required for a work item.
Customer	Customer needs are one of the sources of product cycle time.
Material	Used during production of a product and contributes to the overall product cycle time.
Operation	Details production operations so that cycle time can be measured before and after improvements.
Order	Order needs to be tracked and traced throughout the manufacturing of the product.
Product	All initial needs link to a product.
Shipment	Shipment to the customer is one of the final stages of the overall product cycle time.
Time	Use Time to address the current cycle time and the target future cycle time.
Work Item	Work will be assigned to a queue. Ability to track work items.
Work Queue	A work queue will be assigned to an employee or partner.

Figure 3.1.4: Information Concept Relevance

Graphically presenting the relationships among the information concepts helps the team solidify its understanding of the problem domain, formalizing a shared understanding of the relevant business information relationships shown in figure 3.1.5. This information is critical to improving production cycle times and it any of it is missing or there are gaps in relationships, those must be addressed as part of the overall solution.

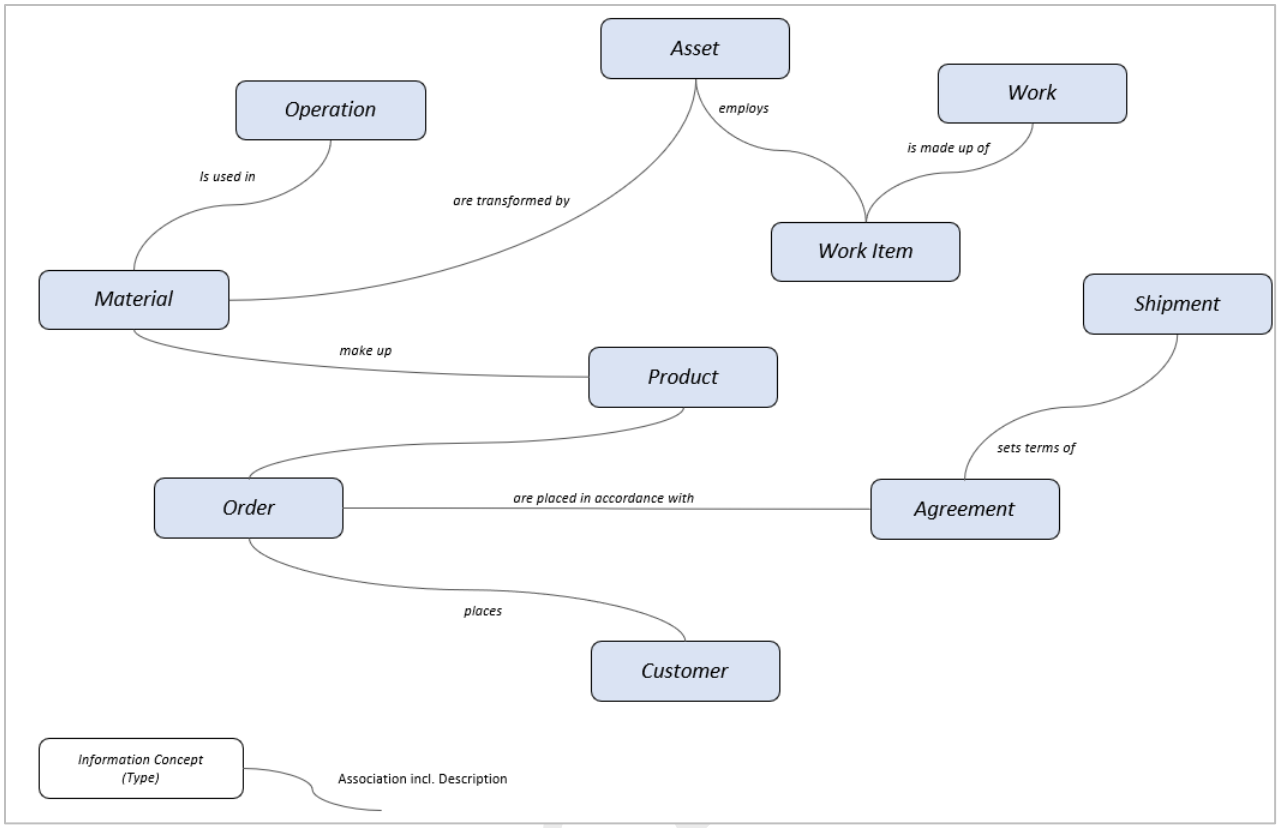


Figure 3.1.5: Information Map

Diagnostic Workshop: Pain Points and Capability Gaps

With the stakeholders identified and briefed, and capability and information concepts identified, the business architects and other can planned and lead one or more workshops to dig deeper into the pain points. The workshops, split up or addressed in a single session, will gather stakeholder inputs and perform a deeper capability assessment on the Manufacture Product value stream. The workshop(s) breaks down as follows.

- Review and confirm analysis and related business information captured to date
- Identify concerns and pain points for each value stage from a people, information, and automation perspective
- Identify value delivery gaps in the value stream
- Identify and heat map problematic capabilities under each value stream stage
- Prioritize opportunities that address pain points and align with the future vision

The result of the initial workshop sessions identified 3 major pain points and related capability gaps. These are shown in the table in figure 3.1.6.

Pain Point	Capability Gap
The material plan is developed manually and there is no integration to the production plan	Material Assembly
The manual processes add to the work management queue and cycle time for the ordering and receipt of materials	Material Inventory Management
Each functional group manages its own schedule making it difficult to see where dependencies exist	Work Queue Management

Figure 3.1.6: Pain Point / Capability Gap Analysis

The stakeholders determine that the most critical capability gap tied to delivering value in the Make Product stage is Material Assembly. The value item defined for this stage is "Product in assembled or processed state". A second major capability gap involves Material Inventory Management in the Prepare Materials value stage. The value item defined for this stage is "Material is readied for product assembly or processing". The primary reason that the full value proposition is not being achieved results from issues in the business's ability to assemble the supplied material that feeds into the final product.

The heat map also highlights issues in the Work Queue Management and Asset Configuration capabilities feeding into the Initiate Manufacturing Cycle stage, and Work Queue Management in the Make Product stage (highlighted in yellow). The capability heat map shown in figure 3.1.7 summarizes the overall set of problematic capabilities.

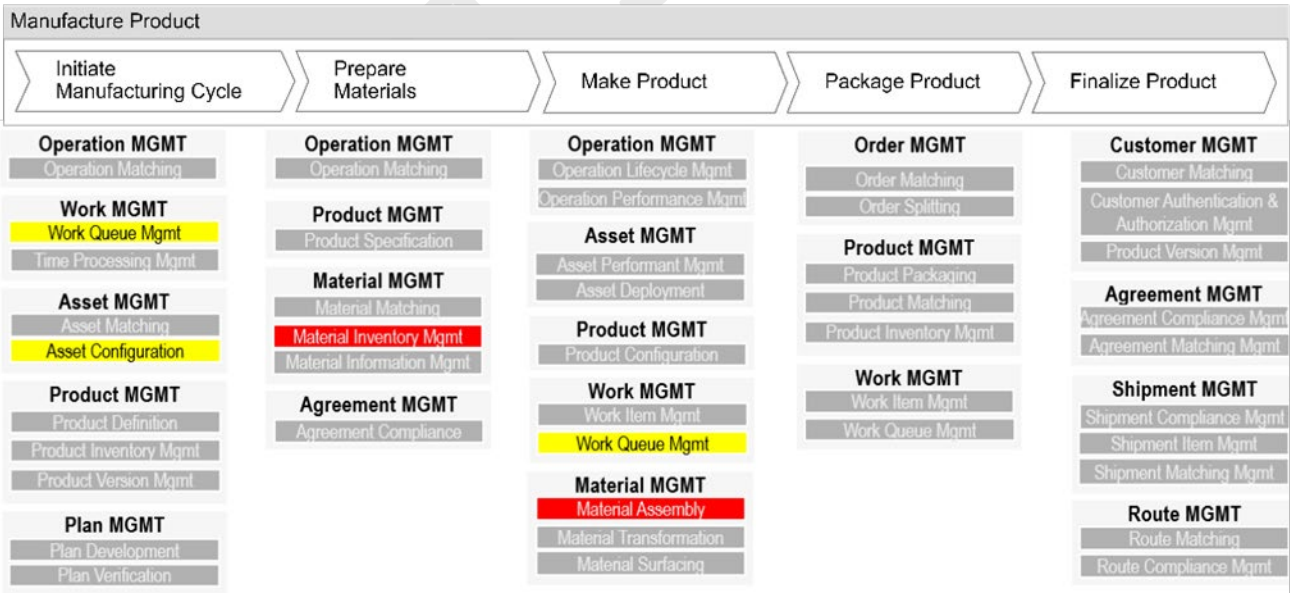


Figure 3.1.7. Capability Heat Map

Linking Pain Points to Opportunities

Understanding the priorities dictates that stakeholders and the organization's energy should be

spent on the various contributors to Material Assembly and Inventory Management. Just as important, the team is not distracted by some promising tool their production engineer or a vendor is excited about that might make Asset Deployment better, or that could provide a great interface into Product Configuration Management. Those areas are not the priority issues limiting the business value. The pain points are tied to opportunities to address them and the capability gaps to fill in the table in figure 3.1.8 below.

Pain Point	Opportunity	Capability Gap Addressed	Dimension – Addressing the Gap
The material plan is developed manually and there is no integration to the production plan	Closer integration between material plan and production plan, possibly including automated support tools to improve accuracy	Material Assembly	Tool Information
The manual processes add to the work management queue and cycle time for the ordering and receipt of materials	Start by breaking down silos and implement a cross-functional team that works toward common outcomes Determine if a tool integration would decrease cycle time further	Material Inventory Management	Process
Each functional group manages its own schedule making it difficult to see where dependencies exist	Implement a cross-functional team with one schedule	Work Queue Management	Process

Figure 3.1.8. Execution Scope

Path Forward

With the major issues identified and vetted by the stakeholders, THE BUSINESS ARCHITECT IS ready to propose initiatives that are based on the opportunities identified in the capability assessment and align to strategic objectives. The initiatives are initially scoped at a high level for the plant leadership team. Evaluation, refinement, and implementation of those initiatives are subjects for further scenarios. The outcome of the Manufacture Product value stream assessment suggests that the business may benefit from a similar review of the Acquire Material and Optimize Asset and Material Inventory value streams. The business architect makes a note to propose, with supporting documentation, a follow-up into these areas.