How to Overcome Three Obstacles to Accelerate Innovation in Manufacturing Operations With Bimodal

Published: 18 May 2017   ID: G00318121

Analyst(s): Simon F Jacobson

A bimodal approach to manufacturing operations can enable continuous innovation without bringing operations to a halt. However, supply chain leaders responsible for manufacturing strategy will need to overcome three obstacles to help ensure their bimodal initiative doesn't fail.

Key Challenges

- Manufacturing operations is challenged to concurrently manage achieving digital aspirations while meeting core objectives for cost, quality and process capabilities.

- Inspiring Mode 2 activities requires diverse approaches to innovation. Traditionally risk-averse cultures and current incentives for manufacturing operations do not promote commitment to pursue and experiment with the intangible opportunities of Mode 2.

- Supply chain leaders are challenged to develop a structured approach to identify when and how to operationalize, scale and synchronize the activities between Modes 1 and 2 in manufacturing operations.

Recommendations

To design and align the manufacturing strategy with bimodal skills and competencies:

- Jointly develop risk-and-reward models with factory and functional leaders that favor embracing uncertainty. Be prepared to augment traditional lean thinking and develop a rapid process to fund Mode 2 projects that is not dependent on traditional business cases and customary ROI approvals.

- Widen the innovation paradigm by making Mode 2 an incubator to develop, nurture and test new processes and solutions. The inspiration for Mode 2 will not always come from inside the company.

- Embrace failure as a means to drive more intelligent learning. Crowdsourcing collective learning to empower workers to take bold decisions more frequently.
Develop a cyclical plan to operationalize, scale and synchronize between modes. Transition from Mode 2 to Mode 1 when the uncertainty of the outcome diminishes.

Table of Contents

Introduction............................................................................................................................................ 2
Analysis..................................................................................................................................................4
  Jointly Develop Risk-and-Reward Models With Factory and Functional Leaders That Favor Embracing Uncertainty..................................................................................................................... 4
  Widen the Innovation Paradigm by Making Mode 2 an Incubator to Develop, Nurture and Test New Processes and Solutions.................................................................................................................. 5
  Drive Mode 2 From the Bottom Up............................................................................................. 6
  Act Like a Venture Capitalist, and Promote New Partnerships and Lean Startups....................... 6
  Embrace Failure as a Means to Drive More Intelligent Learning......................................................... 7
  Develop a Cyclical Plan to Operationalize, Scale and Synchronize Between Modes....................... 8
Gartner Recommended Reading........................................................................................................... 10

List of Tables

Table 1. Differentiation of Mode 1 and Mode 2 in Manufacturing Operations........................................... 3

List of Figures

Figure 1. Develop a Cyclical Plan to Operationalize and Scale.............................................................. 9

Introduction

Bimodal — the concept of having two distinct but coherent approaches to creating and delivering business change — is no longer a novelty for manufacturing operations. The digital aspirations for manufacturing operations, such as lights-out production, self-adapting production lines or using new technologies like wearables, must be balanced by solidifying core processes and continuous improvement competencies. Bimodal offers relief through two modes of operations that are each designed to develop and deliver quality, customer value (growth) and perfect orders (revenue) in their own way.

Like Mode 1, Mode 2 is a necessity. Both modes are required for manufacturing operations to build and scale new skills and capabilities. Table 1 highlights the characteristics and uses of each mode. Digitalization has spurred urgency. The speed and pace of change in industry are steadily
decreasing the length of time to exploit competitive advantage. It’s tough to find a growth and innovation strategy today that doesn’t move fast.

Table 1. Differentiation of Mode 1 and Mode 2 in Manufacturing Operations

<table>
<thead>
<tr>
<th>Definition</th>
<th>Key Characteristics</th>
<th>Used to Accomplish</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mode 1</strong></td>
<td>A style of work optimized for areas that are predictable, improving and renovating in well-understood areas.</td>
<td>Focused on incremental improvements to safety, cost and efficiency.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stability, simplification and consistency through proven frameworks or methodologies like world-class manufacturing (WCM) or total quality management (TQM).</td>
</tr>
<tr>
<td><strong>Mode 2</strong></td>
<td>Allows the future to reveal itself through exploration and experimentation. It is not:</td>
<td>Focused on agility and speed, without any specific sequence. Its nonlinear characteristics enable quick and differentiated exploration.</td>
</tr>
<tr>
<td></td>
<td>- An outcome</td>
<td>Fluid and adaptive.</td>
</tr>
<tr>
<td></td>
<td>- An operating model or organization chart adjustment</td>
<td>A nursery for factory of the future initiatives.</td>
</tr>
<tr>
<td></td>
<td>- An IT capability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- A single capability, event or project</td>
<td></td>
</tr>
</tbody>
</table>

Source: Gartner (May 2017)

The pace of Mode 2 in particular places pressure on manufacturing operations — manufacturers do not have the luxury of time to convalesce. Much like an organ transplant, the implementation of a new way of working or innovative manufacturing model needs to have fast uptake and convalesce in a short time period; otherwise, it can be rejected and fail.

Organizations need to overcome the following three obstacles to avoid rejection and achieve success with bimodal in manufacturing operations:

- **Internal politics and an organizational culture that do not accept ideas from the outside.** Mode 1 cultures often resist having their core work systems and metrics renovated as part of a different approach to improved enterprise performance. Challenging existing norms will perpetuate cultural differences between Mode 2 (small groups of innovators with fresh ideas and diverse thoughts) and Mode 1 (larger populations of risk-averse cultures that are steeped in decades of proven lean and continuous improvement methodologies). The two modes should exist concurrently and in a complementary fashion.
Factories with zero tolerance for failure. Preventing unplanned downtime is still a primary objective for many factories. Without clearly defined success measures and financial ROI — as well as documentation and training — there is trepidation to gamble on uncertainty or intangibles despite the profound improvement and benefits that can result.

Competing performance objectives across a diverse and increasingly complex manufacturing network. These make it difficult to operationalize and scale Mode 2 initiatives into Mode 1. The obstacles span sites operating as stand-alone profit and loss (P&L) to those that have recently been rechartered to produce a different mix or volume of products.

Supply chain leaders responsible for manufacturing strategy can overcome these hurdles. This research details the best practices to achieve success with Mode 2 in manufacturing operations.

Analysis

Jointly Develop Risk-and-Reward Models With Factory and Functional Leaders That Favor Embracing Uncertainty

Mode 1 changes often are defined by lean and continuous improvement efforts over many years. There is significant cultural acceptance of the incremental and proven efficiencies and cost savings. Lean thinking and cultures have dispersed into several functions, and most of the operations teams are working in Mode 1 environments on a daily basis as part of a company’s operating system. Mode 1’s enhancement of known capabilities is often demonstrated by the steady improvements manufacturers see year over year.

The high degree of uncertainty and experimental nature of Mode 2, where fewer project details are known upfront, is a concern for Mode 1 cultures.

Even in instances where factories are proactively seeking the supply chain’s support to help drive new methods and approaches that improve performance, the ability to depart from short-term optimization or steadfast adherence/compliance to plan-based belief systems and comfort zones is not easy.

Bimodal does not offer a way to avoid tackling thorny issues of renovating the cultural and structural core of manufacturing operations. Nor is it an excuse to extend or breathe life into outdated or ineffective behaviors and processes. Instead, bimodal requires developing operational discipline to achieve synchronization between the two modes. It starts with changing the discussion on risk and ROI.
Mode 1 will always favor cost-based returns visible through quality and/or process capability improvements. Applying a similar reward or ROI model to the early stages of Mode 2 projects is the kiss of death.

Mode 2’s value isn’t always financial or within a specific time frame. Instead, as investments in new methods and technologies unfold, the ROI might become visible in ways and time frames that will vary from previous approaches. Still this might not be enough for plant or regional P&L leadership. While the value might be clear, adoption can be hindered by competing objectives, metrics, financial returns, profound change to existing methods and procedures, or simply waiting for existing investments to depreciate.

For success with Mode 2, supply chain leaders should work with plant managers and specific capability or discipline leaders (e.g., those responsible for maintenance or quality assurance/quality control processes) to jointly develop and reward mechanisms that favor gambling on the intangibles:

- **Develop metrics that promote adoption and reuse of new solutions.** This creates a direct feedback loop from end users while identifying the right approach to scale. One company that introduced wearables to improve the visual inspection of finished goods acknowledged that the move would fundamentally change how its workers executed specific methods and procedures. It added a project-specific metric for operator ease of use to ensure that processes were not disrupted by technology.

- **Augment yearly objectives for plant leaders.** This will encourage the testing of hypotheses and experiments that could yield a higher percentage of improvements. A steady, even if small, results stream is key to demonstrate proof there’s value and that the next 1% to 3% of cost out can have high impact. Start by using Mode 2 to solve a Mode 1 problem. When the approach to a commonly desired outcome is appropriately disrupted, the ROI will follow. One company shifted from static dashboards to visual cues specific to operators on an assembly line, and productivity improved 5% in three months.

- **Maintain simplicity.** Nontechnically in-depth projects that include mobile devices or new ways of interacting with pre-existing information and/or processes are often catalysts. They prompt Mode 2 and Mode 1 teams to work together and adapt the new styles of work or technology interactions into best practices. These best practices can include scaling solutions faster, refactoring business processes and an alternative approach to benefits realization.

**Widen the Innovation Paradigm by Making Mode 2 an Incubator to Develop, Nurture and Test New Processes and Solutions**

Organizations where leadership is cautious on speed or innovation — or that limit themselves to top-down-driven innovations rather than a bigger pool of open thought — will face problems...
achieving success with Mode 2. Top-down-driven approaches do define what success and outcomes might be needed. However, they don’t always take into account the day-to-day nature of how factories and production lines operate.

**Drive Mode 2 From the Bottom Up**

A few manufacturers we interviewed for this research shared that senior leadership might hear about and be aware of a specific opportunity but might not understand the intricate nature of the problem. Rather than working to understand the cause of frustration or why there is need for a different solution, leadership would focus attention and resources elsewhere. These same manufacturers shared that once a proven concept or solution was presented, their management teams reversed course and promoted and funded it. How did this happen? These companies decided to pursue Mode 2 from the bottom up.

Initiatives started with the individuals responsible for a specific capability or competency and/or specific site leaders that were open to experimenting with Mode 2 to fix a Mode 1 problem. This is different than the existing collaboration with innovation labs or advanced manufacturing engineering organizations. While those organizations might be part of an enterprise bimodal strategy, in these instances, the opportunities identified were more than new ideas. These bottom-up approaches were tethered to specific/targeted problems and improvement opportunities (such as accelerating product testing and finished goods release).

These efforts should not be confused with shadow IT or skunkworks projects. Nor are they an endorsement of those activities. While Mode 2 can use an "under the radar" funding model to start small and provide an initial stream of results, it is legitimized. Unlike shadow IT, some organizations have set aside small budgets with indefinite and nonfinancial ROI. This is safer as it ensures that results are proven and solutions are repeatable.

Some organizations have achieved bimodal success through internal competitions that promote new approaches to low-hanging fruit, like energy reduction. Other performance-based outcomes provide a platform for factories to demonstrate an innovative capability to substantially increase productivity or lower costs. As an outcome of a competition-based effort, an aerospace manufacturer established a peer-to-peer community. In the community, the interactions between participants — who can come from anywhere in the organization — have stimulated new ideas and transference of best practices and standards. It has also helped shed a dominant "not invented here" culture within sites.

Be aware that competitions might surface Mode 2 manufacturing operations projects that have been ongoing — just not discovered. Reinforce that the intent of the competitions is to identify new solutions and problem-solving approaches rather than judge on performance achievement alone. Focus on specific, rather than generic, opportunities.

**Act Like a Venture Capitalist, and Promote New Partnerships and Lean Startups**

The inspiration for Mode 2 will not always come from inside the company. Partners — existing and undiscovered — are capable of focusing on specific solutions and adding expertise or influence that does not exist within the enterprise. Initiatives like Industrie 4.0 and smart manufacturing have
spurred interest in various organizations, such as the Industrial Internet Consortium (IIC), the Smart Manufacturing Leadership Coalition (SMLC), Digital Manufacturing and Design Innovation Institute (DMDII), Plattform Industrie 4.0, the Singapore Manufacturing Consortium (SIMCO) and the European Factories of the Future Research Association (EFFRA). These groups provide opportunities for new partnerships, access to partners and startups, joint definition of new industry best practices, and program funding.

Involve partners through an incubator or environment where your organization acts like a venture capitalist. This offers a unique setting for mutual learning and co-creation. As an example, Airbus operates a global network of accelerators called Airbus BizLab (see "For Supply Chain Executives: The Bimodal Challenge"). Its charter is to not only accelerate internal innovation within Airbus, but also rely on outside participants, including customers and companies from other sectors. In a six-month acceleration program, it mixes internal and external participants to promote an innovative culture throughout Airbus. This enables the company to work efficiently with startups while simultaneously allowing smaller structures to better understand the needs and methods of large groups. Companies it partners with have office space; access to prototyping and test facilities; and dedicated demonstrations with Airbus leadership, partners, subsidiaries, customers and venture capitalists.

Similarly, Siemens is establishing a new business unit called next47 that will also act as an incubator for development of new technologies and disruptive concepts. The new unit will have funding of €1 billion for the first five years and will build on Siemens’ existing startup activities. It will be open to employees as well as founders, external startups and established companies if they want to pursue business ideas in the company’s strategic innovation fields.

Embrace Failure as a Means to Drive More Intelligent Learning

Despite the curiosity to explore, the cost and disruption of unplanned downtime has too much impact on how production functions. Zero tolerance for failure in factories is often a detriment to getting started. However, today's setbacks are tomorrow's platforms. Companies are beginning to adopt processes that allow them to fail faster and gain comfort applying bimodal in their manufacturing operations.

Not all operators, engineers and other factory workers are born with innovation in their genes or given the liberty to showcase it. Manufacturers need to encourage exploring possibilities with an understanding that it's okay to fail and an acknowledgment that not every effort will succeed. Encourage employees to think beyond short-term success and toward how investment is deployed over the long run to lead to innovation.
An equipment OEM systematized failure as part of a broader digitalization initiative for its manufacturing sites. It wanted to keep pace with evolving technology paradigms, including open source, edge computing and cloud. Rather than spend months defining user requirements and precise specifications, it took on a mindset that "not every pilot will achieve what we want it to on the first run." It did choose to run pilots and proof of concepts (POCs) with sites and process-owners where there was a cultural propensity to experiment born out of frustration. These were groups that were constrained in this case from being successful or improving work processes. They were open to change and, more importantly, accepting and owning a solution. Doing multiple development sprints with these teams helped identify specific needs for certain technologies and targeted the POCs, and laid a foundation for reuse. Each failure had a different lesson for how to change the relationship users had with the technology, reinforcing an iterative and exploratory approach.

Crowdsourcing collective learning in risk-averse cultures empowers workers to make bold decisions more frequently and more often. A chemicals producer saw failure as an area to explore as a means to garner participation in its initiatives. It established forums for open discussion on what has not worked. Large audiences share project details and where they were not successful, and forum members provide feedback or share like experiences. This open dialogue helps surface common mistakes in early stages of Mode 2 initiatives and helps define more clearly what is needed for success or at least the next foray.

Develop a Cyclical Plan to Operationalize, Scale and Synchronize Between Modes

Bimodal is cyclical and not episodic. Mode 2 is a nursery to develop capabilities that can selectively be transplanted to other parts of the manufacturing function. Even with acute clarity on shared value or defined efficiency improvements, the transplanting or scaling of initiatives from Mode 2 into Mode 1 triggers change in both modes. Mode 2 requires unlocking for sustained innovation, while Mode 1 needs scale for ongoing improvement of capabilities.

Synchronizing between the modes should ultimately be natural. The ability and discipline to link what is developed in Mode 2 to the production system so it demonstrates value within Mode 1 (as part of an iterative approach) is critical. Companies without a stable platform of core processes, systems, metrics and behaviors to anchor Mode 1 will struggle to achieve benefits with bimodal.

A cyclical plan to operationalize, scale and synchronize between the two modes must be implemented (see Figure 1). This will answer questions such as: "When is the time to scale?" and "How do we scale without impacting the rhythm of manufacturing operations?"
The following best practices have helped organizations transition from Mode 2 to Mode 1:

- **Transition from Mode 2 to Mode 1 when the uncertainty of the outcome diminishes.** Identify and evaluate high-impact opportunities that either innovate or change the nature of work and translate them into meaningful outcomes. Start with an early identification of candidate projects that create new skills, refactor existing processes, or will substantially impact outcomes (like flexibility or time to market). Track their success or failure as part of a broader portfolio to understand and constantly refine the impact, value and technology requirements needed. When the capacity of Mode 2 is reached and Mode 1 is either capable or there’s clear need for the solution, it is time to transition between each mode. One manufacturer shared it will not evangelize and promote any project that will not show ROI in under two years. At this point, there is a clear understanding that concepts have been proven and deliver value that helps align goals and priorities. This enables a clear business case for scaling into other parts of the organization. It also simplifies the internal communications that Mode 2 develops a new capability to ensure consistency without diminishing Mode 1 capabilities.

- **Prioritize sites with capacity to execute.** Some Mode 2 initiatives, like adidas’ Speedfactory, involve completely new, smaller and targeted factory setups and are part of newer business designs. Other initiatives are operationalized into existing factories and plants. These initiatives are harder and require change to existing factory setups. One manufacturer shared that it had greater success with its larger sites. This isn’t a factor of any risk or concern that bimodal doesn’t work. Nor is it a matter of the management for smaller sites not seeing the value of the
opportunity. Instead, when compared with its larger sites, the smaller sites lack a greater capacity to execute and operationalize Mode 2.

- **Refactor business processes, and integrate workers in the beginning of projects to drive acceptance, reuse and scale.** An automotive OEM used Mode 2 to attack a Mode 1 problem — asset reliability. It sought to get ahead of unplanned downtime and plan its maintenance processes differently. The project focused on one domain within its factories with standardized production equipment. The initiative was proven through the initial gains in availability and uptime. These were benefits and payback that the manufacturer knew were there from the start. Maintenance personnel at the plants were eager for this data-driven change. As they began to interact with data differently, the potential to move from scheduled and/or break-fix to a "maintain by exception" model emerged. Refactoring maintenance processes had impact beyond manufacturing operations. Operational technology (OT) security processes were changed with the introduction of cloud computing and a heavier usage of analytics. In addition, deepening the collaboration with its equipment provider and involving new technology partners meant pivoting some service-level agreements. IT was involved from the start of this initiative, which has helped its success.

**Gartner Recommended Reading**

*Some documents may not be available as part of your current Gartner subscription.*

"Bimodal Is Essential for Balancing Innovation and Capability in Manufacturing Operations"

"For Supply Chain Executives: The Bimodal Challenge"

"Scaling Bimodal: Raising Everyone's Game"

"Five Bimodal Practices With the Biggest Potential Impact for Supply Chain and Operations"

"Supply Chain Innovation: Five Essential Steps Toward Revolutionizing Your Supply Chain"

**Evidence**

1 "Next47: Siemens Founds Separate Unit for Startups," Siemens.

2 Gartner produced this research based on primary research with organizations that have achieved success with bimodal initiatives, experience offered by manufacturing clients, and discussions with manufacturers and other manufacturing experts at user group meetings and professional society meetings.

3 "Adidas Unveils First Futurecraft Shoe Created at Industry-Changing Speedfactory Facility," adidas.