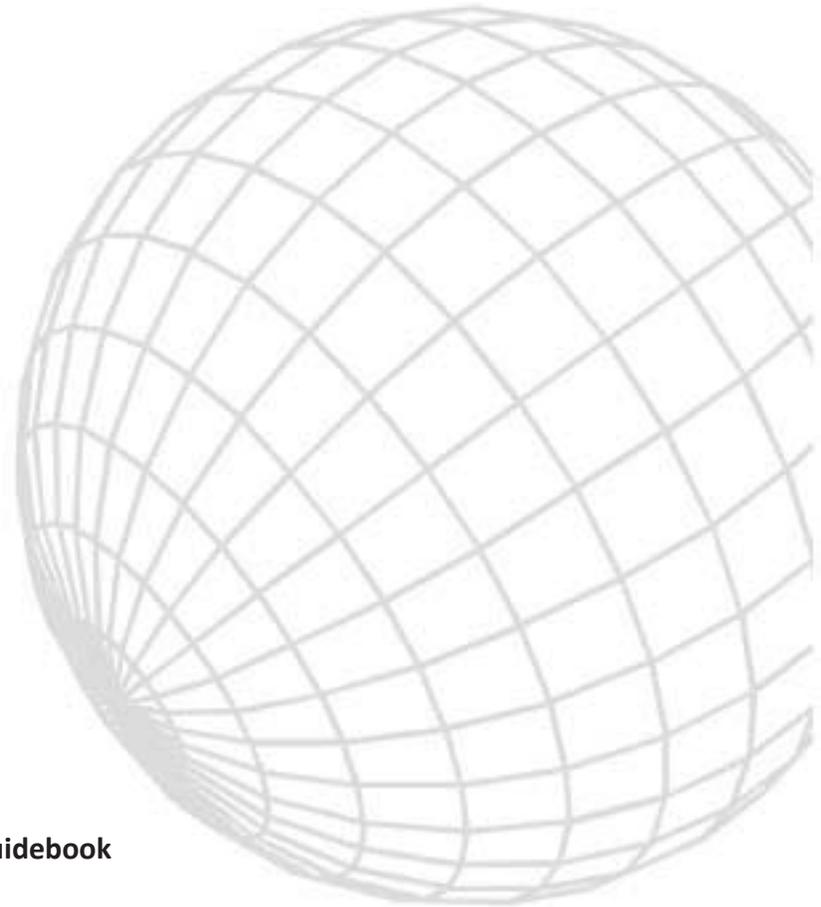




MESA Metrics Guidebook: ROI and Justification for MES



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INTRODUCTION

Few people doubt that investing in manufacturing systems will lead to significant, necessary transformation and benefits. But for a variety of reasons, over the past decade manufacturers have chosen to invest more heavily in their IT, business and logistics systems instead of in their plants. That appears to be changing and, as we emerge from several years of post-recession doldrums, it's become clear that an economy based on service industries alone can't survive in the long run. Manufacturers are returning to their operational and quality roots, putting a renewed premium on production knowledge and moving from being a "neglected" industry to again being the engine of a wealthy economy.

But with their ERP investment still top-of-mind, and with a more realistic understanding of what they actually received (versus what they were promised), manufacturing leadership is understandably much more educated and skeptical of large, capital projects that promise significant value. As they turn to their plants, the source of value creation for their organization, managers are faced with the challenge of determining where and how to invest to ensure that the scarce capital available to them both promotes and is aligned with their strategic initiatives. Where can management go in their organizations to properly characterize the challenges, opportunities, risks and rewards for their manufacturing investments?

Increasingly, leading manufacturers have been integrating key information-based functions with key manufacturing operations domain experts, creating a hybrid Manufacturing IT organization function within a function to help drive the strategic initiatives in manufacturing. The extent to which they are successful is largely determined by whether they have the appropriate executive (CEO, CFO and CIO) sponsorship, their ability to build consensus and a manufacturing vision, and whether they are able to find the appropriate balance/compromise between the unique strengths of their respective domains and those attributes that need to be ceded. Each team in and of itself brings tremendous value, but must compromise on selected objectives prescribed in their individual functional role. There is enough fodder here for another treatise altogether, but instead let's focus on this important dynamic and how it impacts the ability to justify and develop an ROI strategy for manufacturing systems investment.

IT organizations have built core competencies in identifying, prioritizing and, most importantly, justifying large capital projects that have served their businesses well for many years. This has been notably absent in most manufacturing operations domains, largely because the plants have accomplished what has been asked, in a timely fashion and on tight budgets, without the luxury of a standards-based, long-term view of the total cost of ownership. Some organizations with more centralized engineering functions have tried to drive standards and a common approach to manufacturing systems, but in the realm of Level 3 manufacturing

systems have had only moderate success as each plant maintains the right to sustain its own manufacturing workflows and processes. ERP implementations have achieved their value; standardizing business processes that support the financial statements. Unfortunately, many have fallen short of their projected ROI as originally sold to the business and, for this discussion, Operations. The missing link, and by far the biggest challenge, is to successfully justify and garner executive sponsorship for a strategic investment in manufacturing systems.

Sponsorship, therefore, demands an acceptance and execution of the following guiding principles to the affected organization.

1. Holistically understanding, identifying and articulating ALL OF the value of these systems. This may require significant collaboration with the IT and Process Transformation organizations that have devoted substantial resources to finding and documenting ROI for their ERP investments, and know the gaps between what was expected and what was actually delivered. This is important for several reasons, including the prospect of augmenting and/or realizing ROI that was anticipated for the ERP investment, but also to ensure that you don't inadvertently plan for ROI where it's already been claimed. This guidebook will provide significant help in this area, helping you to understand the potential avenues you can realistically pursue.
2. Establishing and communicating the entire manufacturing systems project and ROI strategy in a manner that is consistent with how traditional business investment strategies have been developed and presented to the executive team. This is where the experience and expertise of your IT organization can be of tremendous benefit in the context of striking that fine balance between what will work for the plants, and what the project needs to ensure the appropriate level of rigor, project oversight and long-term system sustainability.

MESA's intent in amassing and presenting this vitally important collection of expertise is to bring together collectively more than 200 working years of experience in how to successfully justify and implement these systems. These best practices will drive a higher degree of collaboration between Manufacturing and IT and further educate all of the stakeholders about the operational value chain. The expectation is an improved ability to effectively develop, communicate and execute real ROI strategies. This education is critical to gain support from executives who are charged with transforming organizations and building thriving manufacturing enterprises globally.

EXECUTIVE SUMMARY

Manufacturers are in business to make money. While operations teams often chafe at the need to justify projects that will clearly help them do their jobs effectively, responsible managers will insist on a sound business case to fund investments in systems and improvement projects.

Unfortunately, many engineers, IT and operations personnel have not been trained to build a financial business case. MESA's members have struggled with the challenge of successfully justifying investments and getting them funded. This guidebook is intended to assist Operations, Manufacturing IT and other non-financial teams to understand how to build a Return on Investment for projects.

Before teaching the basic elements and methods for building a business case, this guidebook explains the advantages of taking a detailed approach to Return on Investment (ROI). Interestingly, a detailed business case is more convincing to gain funding for the project, and helps guide and structure those funded project to be more successful and, therefore, more likely to generate the estimated returns.

Readers will learn how to identify and then quantify benefits. These include revenue increases, cost decreases and other benefits such as risk mitigation and business continuity that may be more difficult to quantify. We provide examples to help Operations and Manufacturing IT teams seek out and recognize when an operational improvement needs to hit a certain level before a financial benefit can accrue.

Readers will also learn how to calculate the true costs and total cost of ownership (TCO) of a project, and identify costs in ways familiar to the executive team. In addition to non-changing issues such as direct and indirect costs and fixed and variable costs, we include new advances such as including energy costs in the bill of materials (BOM). Readers can also grasp sunk and project costs and new accounting mechanisms such as Resource Consumption Accounting (RCA), which is recognized as a mature practice by the International Federation of Accountants.

The guidebook explains the various forms of calculations used in ROI analysis. It also includes information on project funding decision approaches and capital budgeting. There is an explanation of critical aspects of organizational alignment and support with a focus on gaining sustained benefits and evolving them through time.

The guidebook includes:

- Explanations of common terms used in cost-benefit analysis and ROI calculations that are easy to understand
- Detailed equations that allow Operations teams to make a financial business case in the format executives will expect

- Examples that help to bring this guidebook to life for Operations people
- Advice and suggestions on sound approaches to building a business case for projects

As with most MESA guidebooks, this one helps a wide variety of MESA members better do their jobs. Whether you are new to building business cases and need to read every word and equation; have a new manager or job that favors different cost-benefit analysis methods; or simply need a reference manual to refresh yourself on the equations and terms for generating an ROI statement; this guidebook is for you.

We all want to work on projects that truly achieve meaningful benefits, and the methods for ROI calculations this guidebook includes can help you achieve that. Here's how to get more funding for more successful projects in all types of manufacturing and production.

PROJECT DEFINITION

Capital project requests come from many sources and compete for support, funding and human resources.

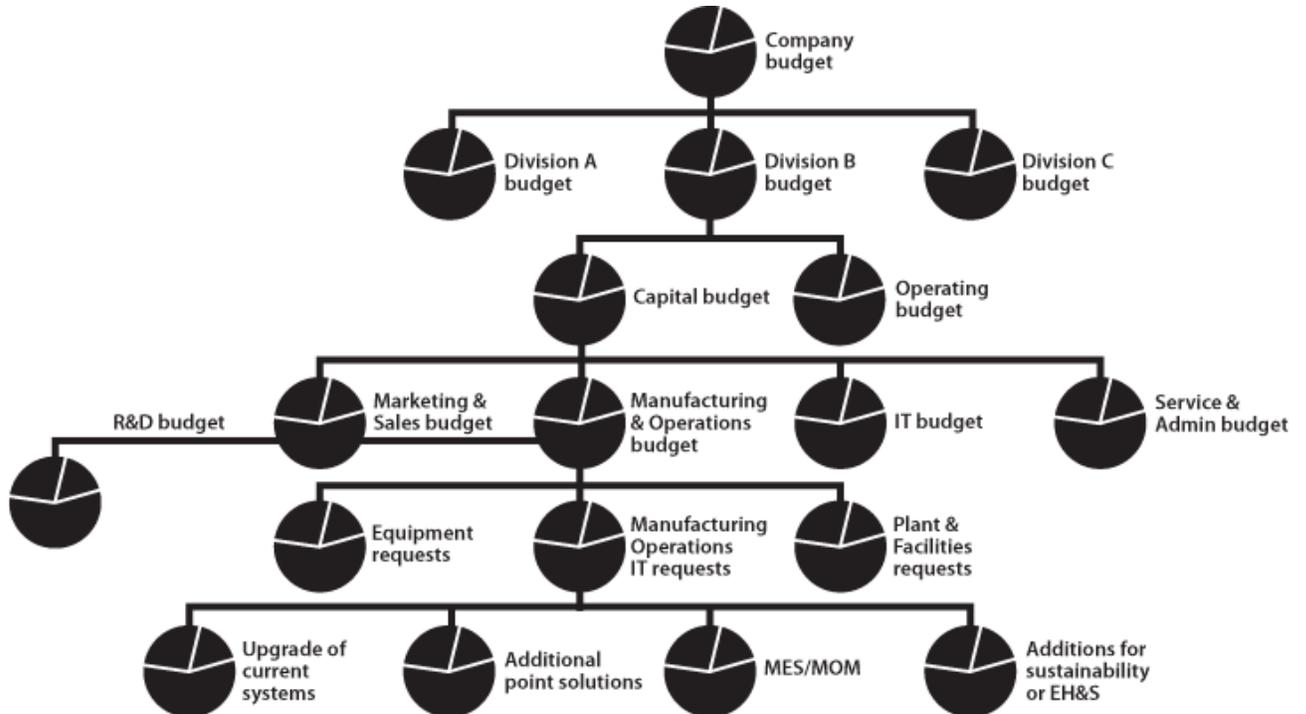


Figure 1: Simplified concept of budget competition among divisions, departments and even within Manufacturing Operations and Manufacturing IT

Figure 1 is a simplified view of that process. Prior to submitting a formal MES project request, it is imperative to clearly define and objectively assess the project goals, including operational improvements and/or issue resolution. All stakeholders must be identified, and strategic alignment and consensus regarding the appropriate solution must be reached. This project definition effort will determine if further project planning is justified and, if so, will position the MES project to be fairly evaluated for approval and funding.

Management support for the project investigation should be confirmed and communicated throughout the organization in order to facilitate the cross-functional, cross-departmental data gathering.

Definition and Assessment Process

The desired future state driving the initiation of an MES project will be a more efficient, cost effective quality operation. The definition and assessment process documents the comparison between the current state and the desired future state. MES is transformational for an organization. The decision to embrace this solution is driven by the problems to be solved and/or the opportunities for improvement. It is foundational to capture and document these business drivers:

- What are the problems to be solved?
- What is the scope of each problem and can it be solved with allotted resources?
- What are the opportunities to improve the manufacturing process through increased visibility and control?
- What are the key business drivers and associated KPIs? How are they measured today? What are the values? What is the financial impact of a percent increase?

While the answers to these questions may be obvious to the initiator of the project investigation, the definition and assessment process is meant to rationally evaluate the current state and communicate the business impact, risk or missed opportunity cost if the project is not approved. Unless the value of the future state can be definitively identified and quantified, the project should not advance. The following chapter, Benefits Identification and Analysis, will detail the methodology for quantifying the benefits of solving a problem and/or achieving improved results. The Definition and Assessment Process includes:

- Documenting how and when an MES system could directly improve the manufacturing process
- Understanding the scope and impact to the organization
- Determining the root cause of the problems or details of the situations to be improved

It is critical to conduct detailed interviews to ascertain how and under what circumstances individuals become aware of the related issues. For example:

- Has the product quality problem affected the last unit produced or the last eight hours of production?
- Is the problem identified by routine tests at every shift change or by an alert operator?
- Does the situation only occur when a specific product or product grade is being produced?
- Do all units, lines or pieces of similar equipment experience the same issue?
- Are environmental factors playing a role?

- Does the situation occur on every shift?
- How are you measured and what KPIs/metrics matter to you? (aligned with sponsor identification)

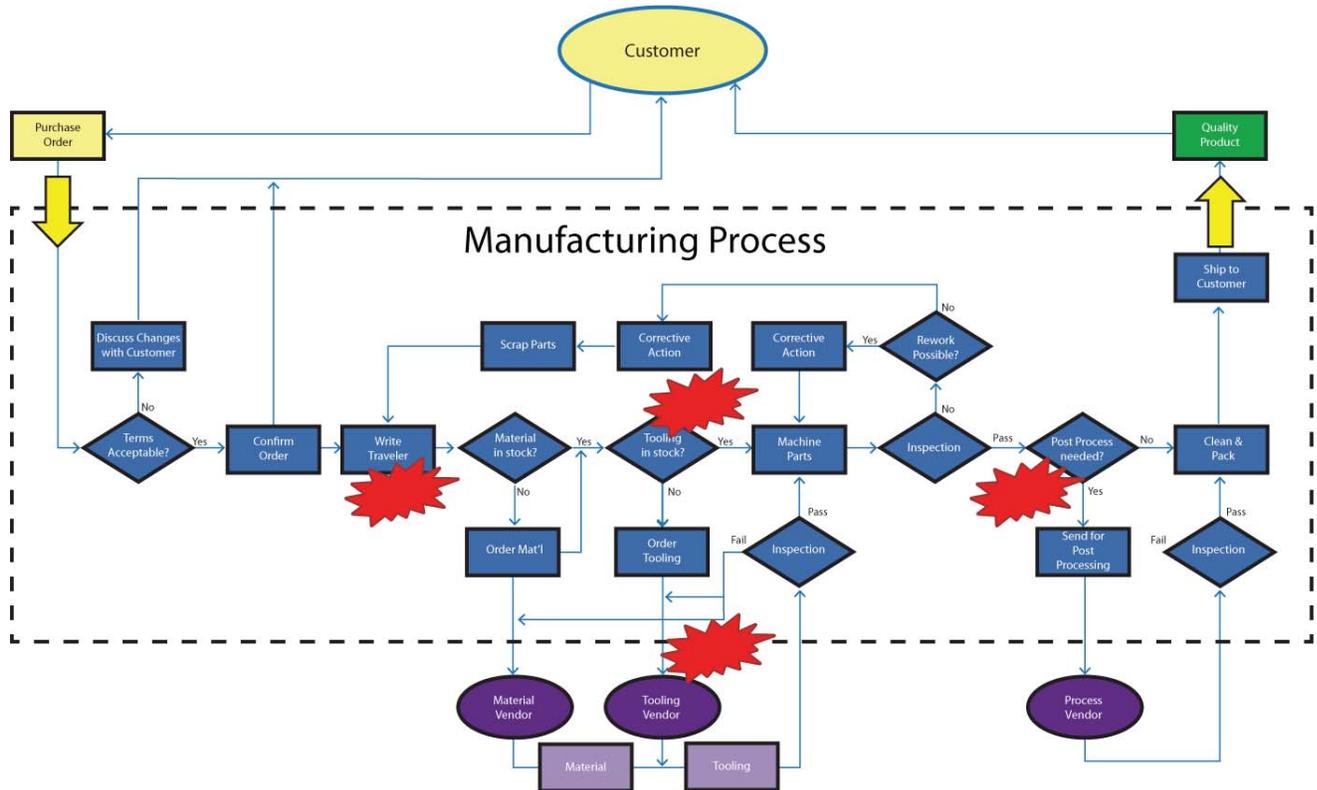


Figure 2: Having a flow chart of the production process with problem areas highlighted is useful in defining your goals. Ideally you show both materials and information flow challenges for the MES/MOM to improve. Red bursts show problem areas that the MES is intended to address

It may be helpful to prepare a process flow diagram with inputs and outputs of materials and information with the notations where issues are recognized by representatives in different roles within the organization. Figure 2 highlights a simple example of areas where the MES/MOM could improve.

A problem or inefficient process typically impacts multiple departments and individuals in terms of time, materials and, ultimately, dollars. Representatives from operations, business management, support organizations, suppliers and customers should be interviewed. Through this process individuals will be identified to represent each of these stakeholder groups on the core team.

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