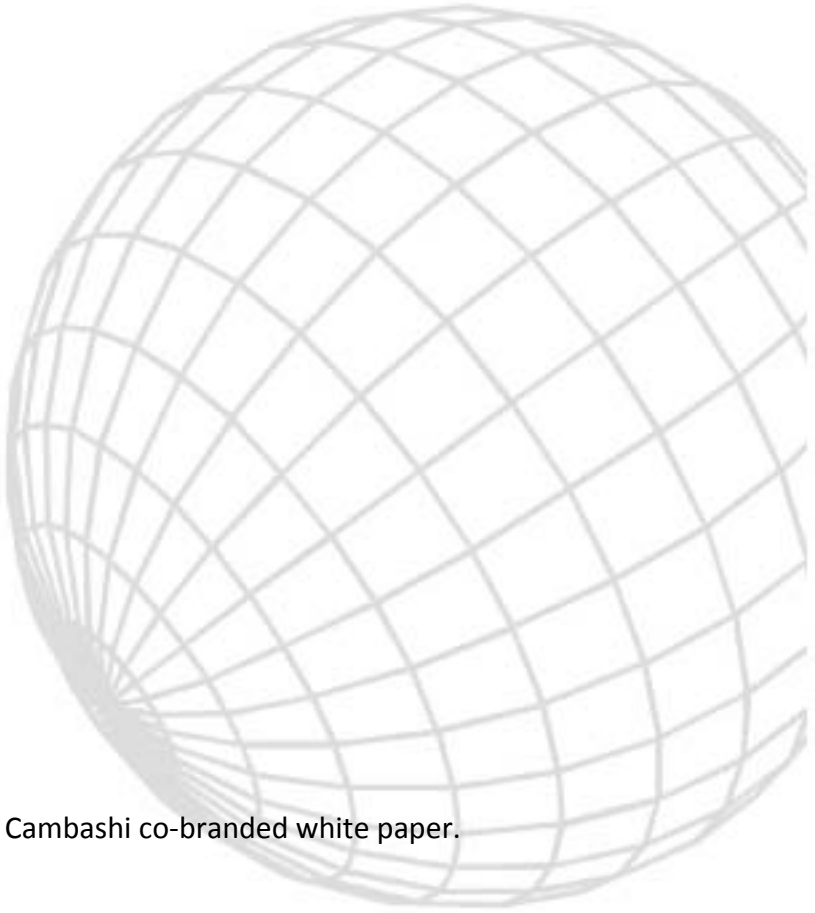
MESA INTERNATIONAL
Driving Operations Excellence

MESA Metrics that Matter Revisited

Public Summary Report of Correlating Plant Performance to Business Performance



A MESA International and Cambashi co-branded white paper.
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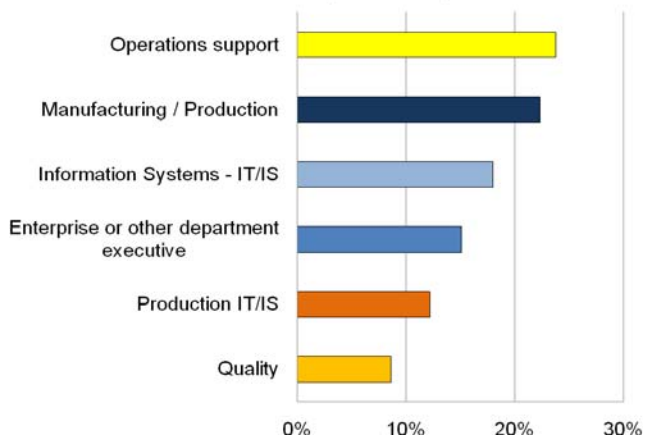
INTRODUCTION

As MESA's previous Metrics studies have clearly shown, metrics do matter in business performance. Plant operations performance improvement clearly correlates to business performance improvement. This public summary report is a sneak peek into the third MESA *Metrics that Matter* primary research study that continues that investigation. The comprehensive report, *Correlating Plant Performance to Business Performance,* is available to Premium MESA members for download from www.mesa.org and covers many more results of the study with charts and discussion.

In a tumultuous economic time, Manufacturing Enterprise Solutions Association (MESA) International teamed up with industry analyst and market research firm Cambashi, the MESA Metrics Working Group, and a set of sponsors from among MESA's solution provider members to further explore performance metrics for production companies. (See Metrics Research Team sidebar.) During the fall of 2009, we conducted an on-line survey and a set of telephone interviews.

This paper presents a small sub-set of the analysis included in the research study *Correlating Plant Performance to Business Performance*. The research analysis was conducted on responses from 140 manufacturers and producers representing a wide range of industries, manufacturing process modes and operating conditions.

The majority of companies in this study did suffer in the economic downturn. Most had lower revenues as a result, and felt a resource pinch. Nonetheless, a group of respondents made improvements in their financial position, and they show a clear path forward.



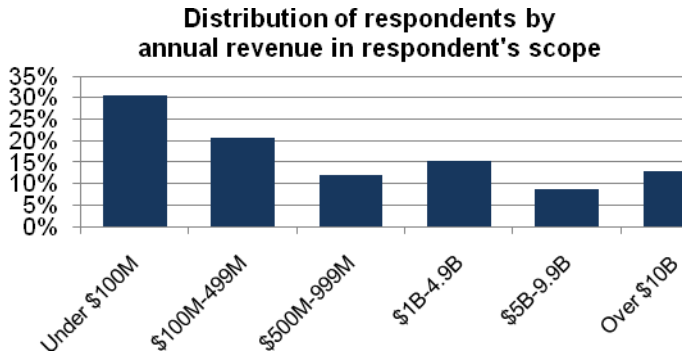
Source: *Correlating Plant Performance to Business Performance*

Figure 1: Respondents are distributed across operations functions plus IT, quality, and other departments.

RESPONSE DEMOGRAPHICS

Respondents to this survey represent an array of roles from a variety of manufacturing and production companies. The response base represents MESA's presence as a worldwide association focused on driving operations excellence across every type of manufacturing and production. This paper is a sample of materials available to MESA members that educate and share best practices in production operations and the IT solutions that support them.

Figure 1 shows that respondents represent the major departments that must measure and improve performance in industrial companies and their plant operations. The vast majority of respondents are managers and executives. They are located in every major region of the world. Nearly 40% of respondents have global responsibility; while one-



Source: *Correlating Plant Performance to Business Performance*

Figure 2: As in the manufacturing/production industry, the largest block of response is from smaller companies, but every size is represented.

third have national responsibility. The rest port that the span of their role is either regional (12%) or local (16%).

All 20 major industry segments included in our list of possibilities were covered as either primary or secondary focus, with a good spread of production types (discrete manufacturing, mixed mode , pure batch and continuous process) and order fulfilment mode (make to stock, engineer to order, configure or assemble to order). Figure 2 shows that respondents represent all sizes of organizations. This diversity also reflects the diverse production universe and the MESA membership.

CORRELATING PLANT PERFORMANCE TO BUSINESS PERFORMANCE

The comprehensive study's title calls out its focus: *Correlating Plant Performance to Business Performance.* One might assume that a manufacturing company's performance in their production plants will have a significant impact on financial outcomes. However, making those correlations is not very direct or obvious. For many production companies, traditional accounting systems and the manner in which they are used prevent an accurate perspective of the financial impact of various aspects of the company's operational performance.

> "Everyone has always said, I wish I had the data to make good decisions. Be careful what you wish for. Once you get KPIs and metrics, there is a responsibility that comes with that. You can't react without understanding what is feeding the performance. The root cause is at the detailed, not aggregate level. Unfortunately when it rolls up, senior management often has a knee-jerk reaction. The new responsibility has to do with providing full context about the operation."
>
> Bruce Taylor,
> Manager
> Business Process Integration
> Suncor Energy (U.S.A.) Inc.

Production companies are quite complex, so most need to work through the process of articulating goals and crafting a system of metrics that is effective. Each company may need to create their own correlations and linkages from corporate objectives to financial metrics to operations key performance indicators (KPIs) and from aggregate KPIs to very specific metrics at the individual, line or unit level. The *MESA Metrics Guidebook* has more on this topic.

So while crafting a set of Metrics that Matter is unique for each production site, this research does show very strong correlations between improvements in operations performance and improvements in business or financial performance. It also indicates that companies of all sizes, production models, and in all geographies have an opportunity to improve their business outcomes.

The survey included 26 operations metrics and 14 business metrics, and the majority of respondents use each of those common metrics. What you measure matters – and the metrics a company gives priority are, rightly, where they are most likely to make improvements.

Some of the ways that operations performance improvements drive financial or business improvements are pretty obvious; others are not. A few of the results that are not surprising:

Quality: There is a very strong correlation between customer reject rate and warranty costs.

Delivery: Companies that improved the most on schedule attainment were also by far more likely to improve on-time delivery to customers.

The comprehensive report also outlines a few strong correlations between plant improvement and business improvement that are not so obvious. These tend to vary by production type.

One of the main ways that we examined what makes some companies more successful is to break the respondents into two groups.

1. **"Business Movers"** are 39% of respondents who report improving business performance either dramatically or broadly on average over the past three years. Specifically, to be in the Business Movers group, companies either improved EBITDA or Net Operating Profit by 10% or made more than a 1% improvement in 10 or more of the 14 business metrics included in the survey.
2. **"Others:"** The other 61% of respondents that either did not improve or may have made some improvements, but less dramatic.

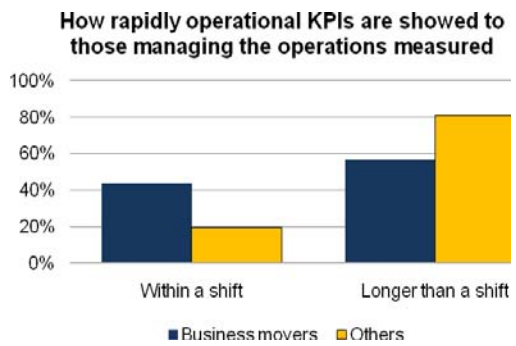
In the charts comparing the groups throughout this paper, as in *Correlating Plant Performance to Business Performance*, Business Movers are represented in dark blue, and Others are in gold.

While their results are different, their demographic profile is very similar. Both groups have a similar breakdown by geography, production type, order fulfilment mode, and size. Over 40% of both groups were negatively affected by the economic downturn in terms of decreases in revenue and volume over the past few years. The slightly smaller portion of Business Movers that suffered is not proportional to their achievements in improving their earnings, profit, or many business metrics in this environment – and their operations and IT metrics as well.

Based on this data, it appears that every manufacturer or producer can improve business performance dramatically, even during challenging economic times. The question is how – what are Business Movers doing differently?

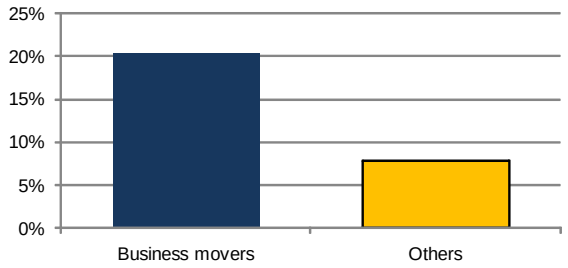
METRICS PROCESSES

One difference between Business Movers and others has to do with their performance metrics system for their operations. As in the 2006 MESA *Metrics that Matter* study, the Business Movers have timelier processes; this fact helps them assess performance trends sooner and guide employees' behavior to avert negative outcomes.



Source: *Correlating Plant Performance to Business Performance,* © 2010 MESA International & Cambashi Inc.

Figure 3: Business Movers are far more likely to show results to operators, supervisors and managers in real-time or within a shift.



Source: *Correlating Plant Performance to Business Performance,* © 2010 MESA International & Cambashi Inc.

Figure 4: Nearly three times the proportion of Business Movers to Others report effective links between business metrics and operations metrics.

The speed of the performance measurement process can make a major difference. As Figure 3 shows, the Business Movers are much more likely to display performance results or operational KPIs to the data creators and those managing the operations within a shift or in real-time. The ability to see the performance of a measured operation within a shift certainly allows a greater opportunity to improve the outcomes.

One of the critical obstacles for many companies in rapid metrics display is collecting data. Business Movers are much more likely to use fully automated data collection. About one-third of each group keys data into spreadsheets. Nearly a quarter of Others have a truly manual data collection system, which is twice the proportion of Business Movers.

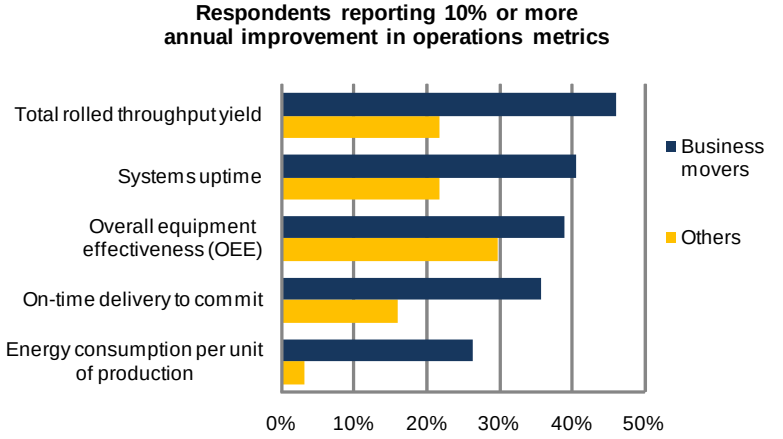
Business Movers are more likely to have effective linkages between business metrics and operations metrics. Even then, the portion is under a quarter of respondents, as Figure 4 shows. They also are more likely to re-evaluate the effectiveness of that linkage frequently. Business Movers evaluate a range of issues regarding their metrics programs more regularly than Others.

MOVING OPERATIONS TO MOVE THE BUSINESS

So Business Movers have faster, more rigorous metrics processes. If the links between business and operational KPIs are sound, we should be able to correlate their business metrics improvement to operational improvements.

Indeed, a larger portion of the Business Movers than Others port they have achieved our highest level of improvement — over 10% — on the majority of operational metrics in the study — 25 out of 26. So the correlation is extremely strong. Those who perform better on financial metrics also perform better on tional metrics. Figure 5 shows just a few examples of operational improvement by 10% or more.

One of the most interesting metrics here, we believe, is overall equipment effectiveness (OEE). Clearly, a significant portion of both Business Movers and Others use and have improved OEE. This illustrates how much momentum OEE has as an aggregate performance metric that includes a view of multiple factors. However, the difference in improvement levels between Business Movers and Others on most other metrics suggests that OEE may not be an adequate measure of operational performance on its own.



Source: *Correlating Plant Performance to Business Performance*, © 2010 MESA International & Cambashi Inc.

Figure 5: Business Movers improved more on the vast majority of operations metrics, with a few exceptions and areas where the portions are similar.

Business Movers improved across a wide array of areas, not just OEE. Two interesting aspects are that Business Movers improved much more on:

1. Some of the things customers care about most, such as quality and on-time delivery
2. IT metrics, including reliability and also data quality

Did the operations improvements directly cause the financial performance of these business movers? We can't say that for certain, and it's rare that the linkages are that direct. However, the correlations between plant performance and business performance are extremely strong.

LEVERAGING IT

Of the 29 specific technologies included in the survey, Business Movers are more likely to widely use 23 of those. Business Movers are much less likely to have homegrown technology in wide use. Figure 6 shows a selection of technologies and what portion of each group reports that they are widely in use.

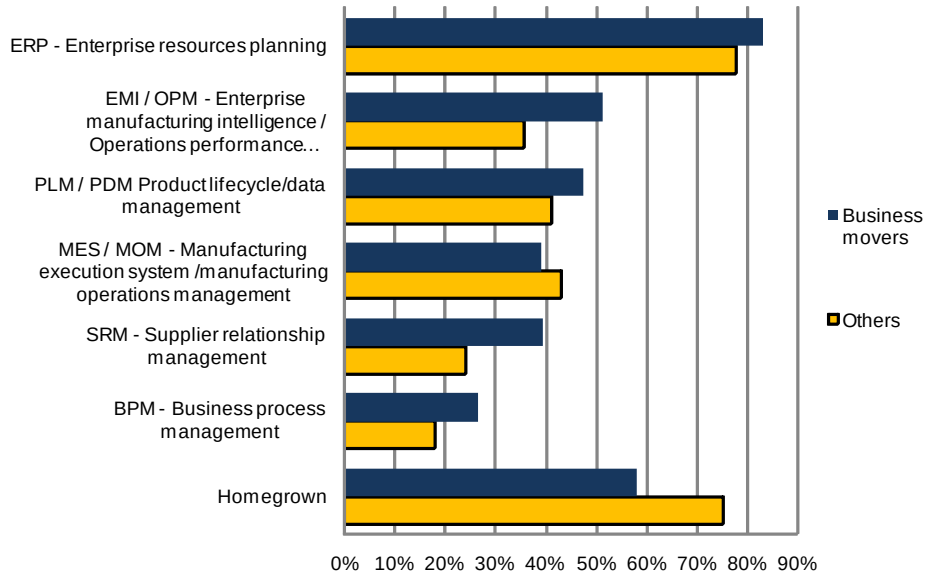


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Figure 6: Business Movers are more likely to use most technologies than Others; some technologies with similar adoption rates benefit from having other applications as well.

A relatively similar portion of Business Users and Others use product lifecycle management and manufacturing execution systems. Business Movers likely gain more benefit because of their wide adoption of many different technologies. In the case of MES, it shares data with other applications. PLM is designed to leverage data from multiple applications to improve product-related decisions and business processes.

Figure 6 shows that Business Movers are more likely to use Enterprise Manufacturing Intelligence or Operations Performance Management (EMI/OPM) as well. These are often displayed as an operations dashboard. Again, the Business Movers are likely getting greater benefits because their operational dashboards are more likely to provide drill-down to root causes, trigger alerts, link to MES/MOM, and roll up to an enterprise scorecard.

Business Movers tend to have IT solutions more widely deployed as well, and having a broader set of IT applications, they are leveraging those investments to gauge performance more effectively. It appears Business Movers are not only linking operations performance to business performance not only in concept, but also with information flows between plant and enterprise systems. The wide array of functions in shop floor to top floor integration can bring tremendous power to decision makers at every level.

DRIVING BUSINESS AND PLANT PERFORMANCE

To summarize the findings of this report, plant performance does correlate to business performance. The Business Movers who achieved strong financial improvements have also improved against their operations metrics. Any company can achieve this, but it does require effective metrics and IT support.

The old adages 'What gets measured gets managed' and 'You can't improve what you can't measure' provide insight into the way companies and their performance measurement systems actually operate. The results of this study show that a metrics initiative can become a business improvement initiative. The key is: the results must be rapidly communicated to people who know they can take action that will improve the metric, and not just filed away in reports.

Production and IT personnel can contribute greatly to the success of their business. MESA International has a main mission to help production and manufacturing industries drive improved operational excellence. This report is part of a set of ongoing MESA activities not only aimed at supporting production and IT, but also helping managers find sound paths to improvement. Management teams need to be able to see the potential of a more responsive and profitable enterprise, in which their view of activity and performance is truly informed by metrics that matter.

MORE INFORMATION AND ANALYSIS

If correlations between operations performance and financial performance as explained here is interesting, please download the comprehensive report, *Correlating Plant Performance to Business Performance*. This 30-page study has over 20 charts and graphs with more detail on the results. *Correlating Plant Performance to Business Performance* is available to premium MESA members from the website, www.mesa.org. That report includes key correlations between operations and business metrics for different process types. It is also prescriptive with regard to best practices based on data analysis, re-

search interviews, and illustrating what those who have improved financial performance do differently than others. Previous MESA studies and papers about performance metrics are also available to Premium Members, including the *MESA Metrics Guidebook, MESA Metrics for Major Initiatives,* and *MESA Metrics that Matter*.

CORRELATING PLANT PERFORMANCE TO BUSINESS PERFORMANCE RESEARCH TEAM

Analyst Team – Cambashi analysts in the US (Julie Fraser) and UK (Michael Morein and Peter Thorne) devised and conducted on-line and telephone surveys, gathered and analyzed data, managed the project, and wrote this report. A further set of specialized analysis was conducted by working group member Hadrien Szigeti of Intercim in France.

MESA Metrics Working Group – This MESA sub-committee drove and guided the project to ensure wide appeal and leverage members' deep domain expertise. Several committee members also reviewed this report and related materials, as listed below.

Industry Leaders – Respondents with good results participated in telephone interviews that appear throughout the comprehensive report document.

Sponsors – Solution providers funded and guided the research based on their field experience. The representatives from these companies also contributed deep expertise to formulating the study and deliverables, and reviewed both this paper and the comprehensive report.

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About Cambashi: Cambashi, based in Cambridge UK and Cummaquid MA USA, provides independent research and analysis of the business reasons to use IT in industry world-wide. It specializes in engineering, enterprise, plant and supply chain applications and the infrastructure to enable industrial firms to use IT effectively. Cambashi publishes market size estimates in the engineering applications Market Observatory and industry issue research studies in the Cambashi Reports Industry Directions series. Its clients vary in size from small to large and include most of the leading software vendors and many pioneering IT users. Cambashi is a member of CATN, an international association of consultants. To learn more, visit: www.cambashi.com

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