Tech-Clarity Perspective:

Best Practices for Factory Adaptability

Top Performers Implement Change Faster and More Confidently

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Executive Overview

Manufacturers must adapt quickly to compete in today's fast-moving, competitive, global markets. They must be agile to take advantage of opportunities and sidestep competitive threats. They have to be able to confidently implement quality, efficiency, and cost improvements resulting from Lean Manufacturing initiatives.

There are a multitude of business drivers that demand change in the factory, ranging from tactical "tweaks" to strategic, market-facing overhauls like introducing new products or product lines. Unfortunately, the old adage that "change is hard" is very true in the factory. Manufacturers face numerous challenges adapting to change. These difficulties result in significant, negative business impacts, including:

- **Project impacts** including cost overruns, unplanned labor, and missed due dates
- **Outcome-related impacts** including poor product quality and low productivity

Changing the factory is complex and brings a lot of risk and uncertainty, but it is essential for survival. Change is simultaneously a harsh reality to deal with and the source of adaptability to differentiate and compete. It's important for manufacturers to make change management a core competency to avoid disruption while adapting to achieve intended benefits.

Changing the factory is complex and brings a lot of risk and uncertainty, but it is essential for survival.

To determine best practices to manage change, Tech-Clarity analyzed survey responses from over 250 manufacturers to understand how they approach change in the factory. The analysis separated respondents into two performance bands based on their ability to hit targets for five change-related metrics. The "Top Performers" were identified as those that are able to meet project budgets, deadlines, resulting production rates, resulting quality, and agility (measured as time to implement changes) better than their competitors. Then, researchers analyzed the processes, organizational structure, capabilities, and enabling software used in order to determine what the Top Performers do differently than "Others."

Top Performers are in better control of their change management process and can implement changes faster and more confidently.

The research shows that Top Performers are able to implement change more predictably. They are better at hitting target budgets and due dates on their change initiatives, and are better at achieving the desired outcome of their change. Specifically they come 25% closer to hitting their target production volume. Although they are still subject to risk and

uncertainty, the Top Performers are in better control of their change management process and can implement changes faster and more confidently. This is particularly true for larger changes (Figure 5), where "getting it right" up front is critical because brute force can't make up for poor planning. How do they do this? Three themes emerged from reviewing their responses:

- Top Performers are much better at **understanding the full scope and impact of changes during the planning phase**. To achieve this, they leverage processes and technologies that allow them to determine the impact of planned changes, simulate changes before they are implemented, and use some emerging capabilities including reality capture and electronically visualizing changes in the context of the existing factory
- Top Performers **communicate and collaborate more effectively**, sharing processes and information across departments. They accomplish this through organizational approaches such as cross-functional teams and change control boards (CCB), processes to share status and information, and technologies that provide online collaboration and a central repository for manufacturing and project information including BIM, PLM, and project management
- Top performers adhere to **more formal processes**, including formal change management processes, six sigma for change, and formal requirements and impact analysis

Adapt or Die: The Change Imperative

Survey responses reveal quite a few business factors that drive manufacturers to change their production facilities (Figure 1). It's interesting to note that not only are there a lot of reasons to change, most manufacturers experience a variety of them. On average, respondents chose just over 6 drivers for change per company. Perhaps the number itself isn't significant, but it leads to the conclusion that each company faces a large variety of reasons to make changes.

The two most common drivers for change are operationally oriented – improving product quality and production efficiency/cost.

The two most common drivers for change are operationally oriented – improving product quality and production efficiency/cost. These motivators, each reported by more than one-half of respondents, target bottom line cost savings. These types of factory changes are often the outcome of Six Sigma or Lean Manufacturing initiatives. Quality may also be a competitive issue. The next three most common drivers relate to adapting to (or introducing) market changes. These are strategic, market-driven investments to introduce innovation to prospective customers and adapt to market demands that impact top-line revenue.

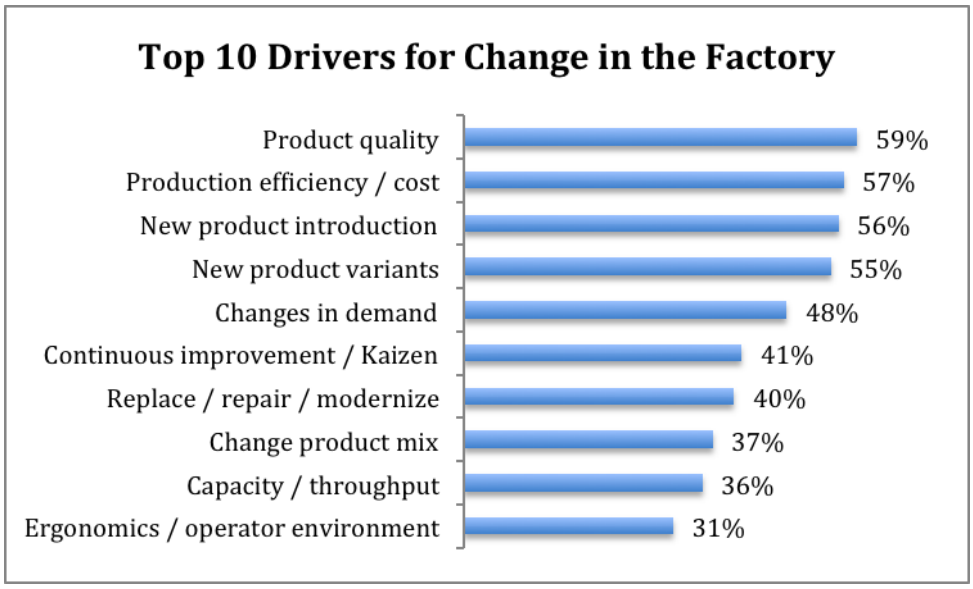

Figure 1: Top 10 Drivers for Change

Adopting factory change management as a core competency isn't just about managing complexity. Managing change is a strategic, business-level issue that impacts both top- and bottom-line performance. Perhaps the top two reasons – quality and cost – are the reasons companies have to change. The next few, however, point out why improving change management performance makes manufacturers more competitive.

Managing change is a strategic, business-level issue that impacts both top- and bottom-line performance.

The Constancy of Change

Change is not only strategic – it is constant. Manufacturers report making minor changes every month or two, moderate changes a few times a year, and major changes once or twice a year (Figure 2). Of course not all changes are created equal. Smaller changes are made more frequently and are likely intended to improve quality or efficiency. But companies also make larger overhauls. They are likely aimed at introducing new products or product lines or making significant improvement to production capabilities or volume. These are also much higher risk and carry more uncertainty. Not only is there a higher risk the project will encounter unexpected circumstances, they are much harder to use brute force to get them back on track if they don't go as planned. With most manufacturers averaging a change a month or more, it's clear that effectively implementing change is a necessity.

Size of Change	Description	Frequency per Year
Minor	Small changes such as new product variants, manufacturing procedures, line speeds, and/or machine settings	6 to 11
Moderate	More significant change requiring new procedures and/or involving new tooling or some minor equipment changes.	3 to 5
Major	Significant change to equipment, procedures, and/or production lines.	1 or 2

Figure 2: Mean Number of Changes in the Factory

Challenges Managing Change in the Factory

Change remains a very challenging and complex exercise despite the fact that adapting is critical to survival and manufacturers implement change frequently. It's not that manufacturers don't recognize the importance of implementing change effectively. They strive to complete projects efficiently to deliver on time, on budget, and to avoid disruption. They try to implement effectively to reap the full benefits targeted by the project. But change in the factory carries significant risk and uncertainty and often requires addressing the unknown. This makes it hard to predict the outcome with certainty and confidence.

How can companies make good cost-benefit or return on investment (ROI) decisions related to change in the factory if they can't accurately determine the cost and other impacts of the change?

What makes change hard? Manufacturers report numerous challenges related to implementing changes. Of the top five most common challenges (Figure 3) reported, two of the top three relate to predicting the results of the change. The most frequently cited challenge was determining the cost of the change. That is a big issue when you consider that the second most common business driver for change is to improve efficiency and cost! The third is more generally understanding the impact of change. It's clear from this that manufacturers face difficulty understanding the full scope and impacts of planned changes. How can companies make good cost-benefit or return on investment (ROI) decisions related to change in the factory if they can't accurately determine the cost and other impacts of the change?

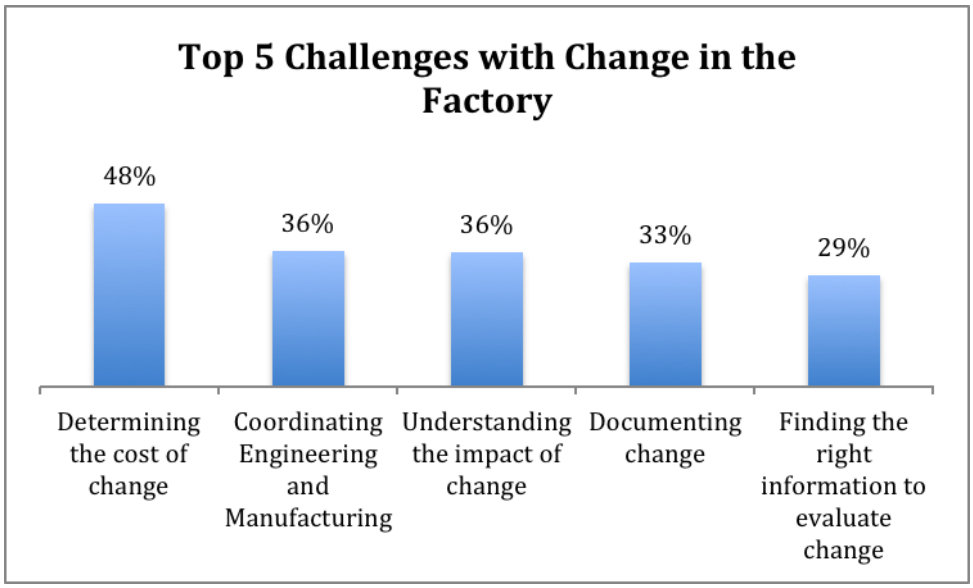

Figure 3: Top 5 Significant Challenges Implementing Change in the Factory

Companies also face coordination and communication issues, in particular keeping Engineering and Manufacturing in sync. Engineering and Manufacturing must collaborate to effectively plan and execute change. Respondents also report information-related issues, for example finding the right information to evaluate change. Communicating changes is also difficult because companies have challenges documenting change. This likely creates a longer-term challenge as well because documentation no longer reflects the current "as is" of the factory.

Business Impacts Encountered During Factory Change

The challenges manufacturers face are frustrating, but more importantly they lead to significant business impacts (Figure 4). Frequent business impacts from change fall into two categories, project impacts and outcome-related impacts. These impacts often occur when things don't go as expected, which is frequently according to the issues reported. Perhaps not surprisingly (because of the challenge of predicting costs), cost overruns are relatively common (43%). Projects are also late and take too many resources. Well over one-third of companies (42%) report unplanned hours or overtime during the project as a significant negative impact and 42% miss project due dates. Experience shows that companies are used to these problems and budget for them, but then still frequently miss their contingency budgets and schedules.

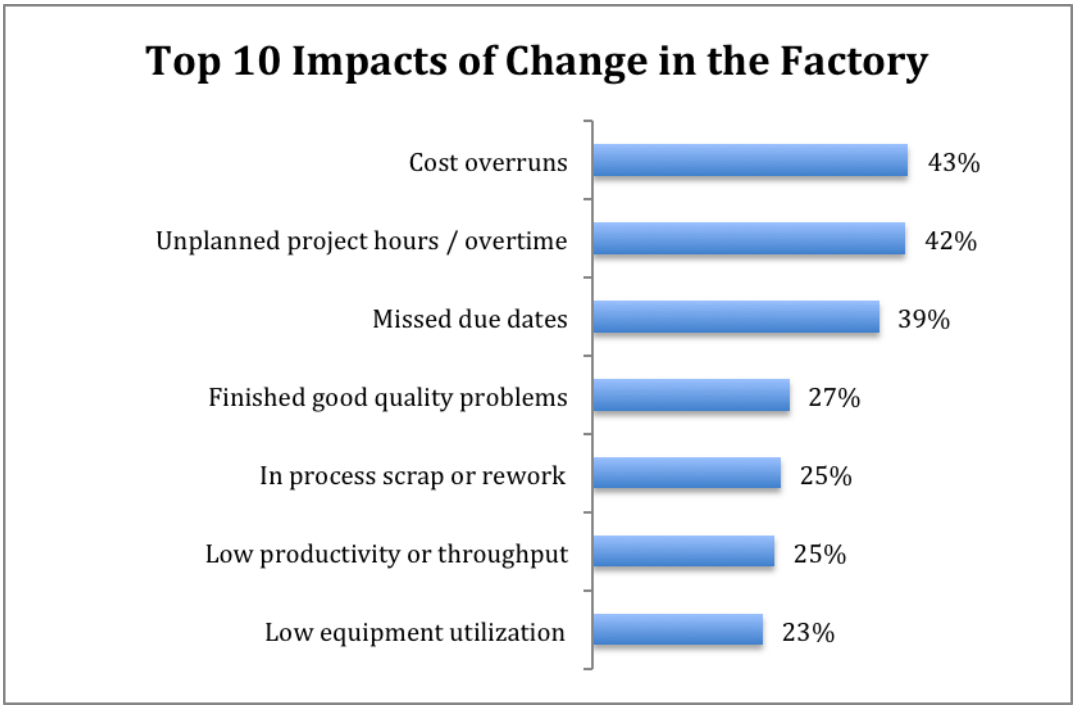

Figure 4: Top 10 Significant Business Impacts of Change in the Factory

Negative impacts due to changes in the factory are not limited to project-related issues, respondents also report impacts related to the outcomes of their projects. In addition to the pain of missing a deadline or a budget, missing the target outcome or intent of a change – be it quality, efficiency, new product introduction, etc. – has implications that manufacturers have to live with well after the project is complete. For example, improving product quality was the top business driver for change, but the third and fourth most frequently reported impacts are finished good quality problems and in process scrap/rework. This clearly indicates that companies aren't hitting their targets. In fact, the change might make quality worse (at least for a while).

Negative impacts due to changes in the factory are not limited to project-related issues, respondents also report impacts related to the outcomes of their projects.

There is also a troubling correlation between the second most common driver for change (production efficiency/cost) and the fact that about one-quarter of companies experience low productivity and low equipment utilization as a consequence of change. This means that the unintended consequences of change have the potential to negate targeted efficiency and cost gains. In the same way companies buffer projects with contingency budgets and timelines, companies frequently buffer risk with excess inventory, further increasing the cost of change.

The challenges and impacts indicate that making changes in the factory carries a high level of risk and uncertainty. In addition to issues from going over budget and due dates on projects, manufacturers are also unable to ensure that projects will produce the intended benefits. These risks and their consequences are directly in opposition to the business drivers for change, creating a strong need to address the issues that make change in the factory hard to plan and execute.

Identifying the Top Performers

How can companies improve change management and its results? To understand that, Tech-Clarity first determined which companies are better at implementing change in their factories. Then, researchers analyzed what they do differently so others can learn from them to improve their own performance. To find out who is excelling at this process, researchers analyzed five metrics to identify manufacturers that implement change more effectively. The survey requested that each participant evaluate their company's performance in managing change in the factory compared to their competitors on their:

- Ability to meet project budgets
- Ability to meet project deadlines
- Ability to meet target production rate / volume
- Product quality after changes
- Agility (lead time for changes)

Researchers analyzed five metrics to identify manufacturers that implement change more effectively.

The metrics addressed a blend of project-related metrics (budgets and deadlines), outcome-related metrics (quality, production rates), and competitive metrics (agility). Respondents with the top 27% of the aggregated scores were defined as "Top Performers." These metrics align well with the top negative impacts manufacturers suffer from, indicating that Top Performers are better able to overcome these challenges. Once the Top Performers were identified, researchers analyzed the organization, processes, and software enablers in place at these leading manufacturers to determine which approaches are more prevalent in these leaders, allowing researchers to make recommendations to Others on how to improve their factory adaptability.

Top Performers Demonstrate Advantages in Adaptability

Researchers correlated performance in other metrics from the survey in order to validate and quantify the benefits of the Top Performers. The leading companies subjectively stated they are better than their competition. In addition, researchers validated and quantified their higher performance with objective metrics. For example, researchers

analyzed their ability to hit their targets related to factory change for due date, budgets, and production volume. The Top Performers demonstrated that they are in better control of their change management projects in the factory.

Top Performers are:

- 12% closer on budgets
- 5% closer on due dates
- 25% closer on production volume

Top Performers demonstrated that they are in better control of their change management projects in the factory.

Researchers also reviewed the amount of time it takes manufacturers to implement changes of different sizes (Figure 5). While there is no significant difference in the median time it takes companies to implement minor changes, Top Performers clearly differentiate their performance on larger changes. The Top Performers are significantly faster at implementing Moderate and Major changes. Larger changes carry more risk. They are also typically tied to larger business priorities, such as introducing a new product or responding to market changes.

Size of Change	Time to Implement Change	
	Top Performers	Others
Minor	2-6 Days	2-6 Days
Moderate	1-2 Weeks	3-4 Weeks
Major	3-4 Weeks	1-2 Months

Figure 5: Median Time to Implement Changes of Various Sizes (see Figure 2 for descriptions of Minor, Moderate, Major changes)

Top Performers are significantly faster at implementing Moderate and Major changes.

It's more important to plan larger projects right up front, understanding the full scope and impact in advance. Minor changes are more predictable and therefore lower risk. In addition, manufacturers can apply brute force to get through minor changes when they have problems. But they are really at risk if a major change goes poorly, for example if a facility doesn't come back on line or get to full production capacity in time for a major product launch. These projects are also harder to recover because of their complexity and scale. Top Performers appear to get moderate and major projects right. The ability to

make changes faster and more predictably is a major business advantage for the Top Performers.

Top Performers Adhere to More Formal Change Processes

The analysis shows that top performers report a number of differences in the way they manage change in the factory. First and foremost, the Top Performers are more likely to follow formal processes for change (Figure 6). They are almost twice as likely (94%) to adhere to very formal change management processes. Conversely, Top Performers are less likely to rely on informally managed or unmanaged change processes.

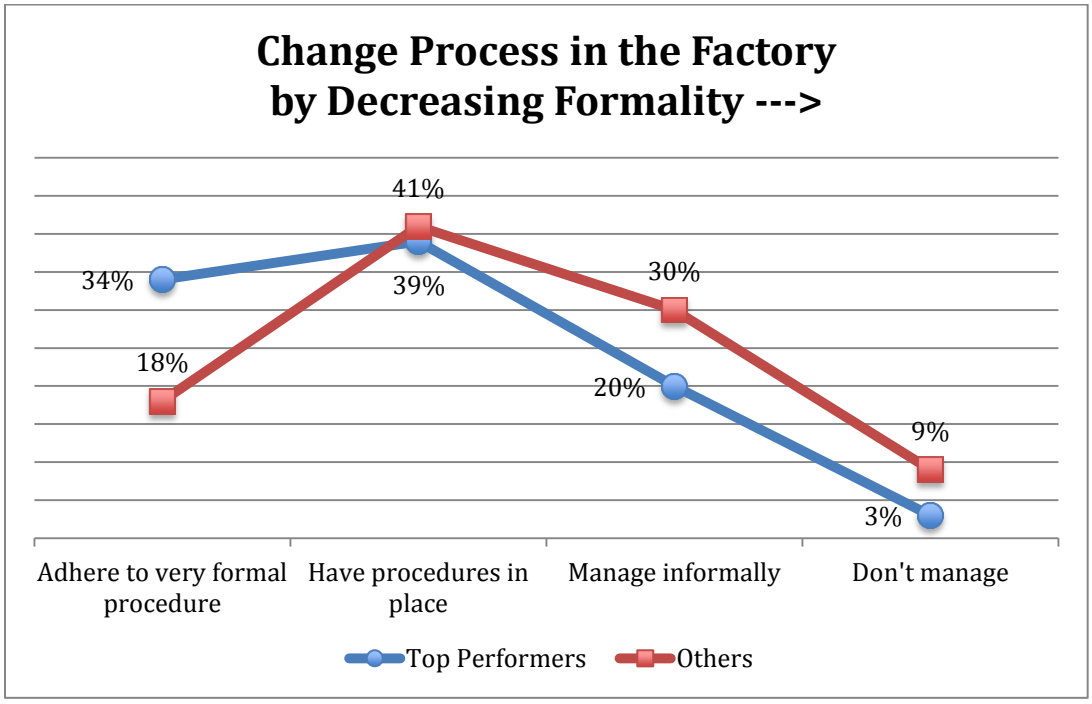

Figure 6: Change Process in the Factory by Decreasing Formality

Formal change management processes are likely an important contributor to the fact that Top Performers implement changes in the factory faster, particularly the larger ones. Formal processes encourage manufacturers to assess the full scope and impact of a project in advance and put in place risk mitigation. They also help identify issues sooner when things go wrong so they can be corrected. It's unlikely that the Top Performers are immune from unanticipated problems during their projects, but their processes allow them to avoid risk through better planning and find out about problems sooner so they can address them quickly when they still have the opportunity to recover.

Best Practices Followed by the Top Performers

Researchers reviewed typical best practices to manage change in the factory in order to determine which are more commonly followed by the Top Performers. The Top Performers generally follow best practices more than Others for all of the practices included in the survey. To understand which played a more significant role, researchers determined which are more differentiated in use by the Top Performers as compared to Others (Figure 7).

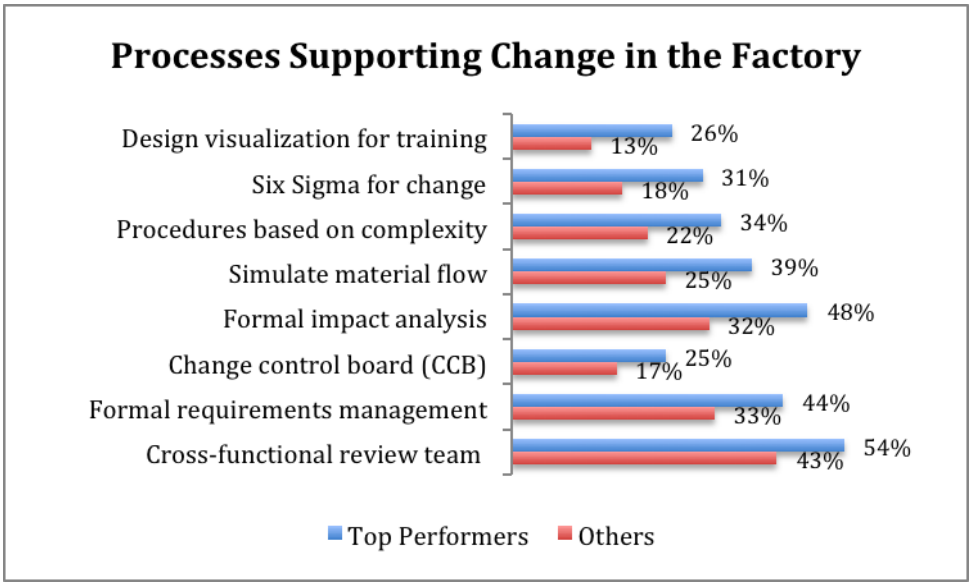

Figure 7: Most Differentiated Processes Supporting Change in the Factory

Top Performers are 75% more likely than Others to use Six Sigma for change, which is consistent with their adoption of very formal change processes. However, Top Performers also are 59% more likely to use different procedures depending on project complexity. Top Performers appear to apply higher levels of discipline when and where it is most needed, while exercising flexibility in managing minor changes.

Top Performers better employ procedures that help them understand the scope and impact of changes in advance.

In addition to the formality of processes, Top Performers better employ procedures that help them understand the scope and impact of changes in advance. For example, they are 54% more likely to simulate material flow, helping them predict and optimize outcomes and prevent late surprises. They are also 53% more likely to have a formal impact analysis process. Almost one-half of the Top Performers have processes to predict the

outcome of projects during the planning phase, allowing them to reduce risk and better understand the full scope and impact of their efforts.

The most differentiated process, which Top Performers are more than twice as likely to employ, is the use of design visualization for training. This is more common in Top Performers, although only about one-fourth of them do this, indicating it may be an emerging best practice. Finally, the only significant organizational finding is that Top Performers are 48% more likely to have a change control board (CCB), a well-accepted best practice to evaluate and coordinate change holistically across functions and departments.

Top Performers Demonstrate Better Operational Capabilities

Not all business practices are formal processes. Tech-Clarity also analyzed valuable practices and company attributes related to change. Top Performers consistently report stronger operational capabilities supporting change management in the factory as compared to Others (Figure 8).

Top Performers consistently report stronger capabilities supporting change management in the factory as compared to Others.

These operational capabilities supported two broad categories of competence. The first category involves understanding the scope and impact of changes. Some of the most differentiated capabilities are in this category, including the most differentiated (documenting the as-is factory). To understand the impact of a change, it's imperative to understand the current environment. The third most differentiated capability (combining new designs with as-is factory in a single view) takes this practice a step further by showing the transformed factory in relation to the current state. Several others, including understanding material flow/cycle time impact and understanding interactions between product, machinery, and tooling are key to predicting and simulating the impact of proposed changes. These help address some of the top challenges relating to analyzing the impact of change.

To understand the impact of a change, it's imperative to understand the current environment.

Other capabilities support better communication, collaboration, and information sharing across departments. For example, the second most differentiated capability is having a central repository for all project and manufacturing data. This helps ensure that all parties are working from the same data. In a similar way, Top Performers are better at understanding machinery and tooling status during the project.

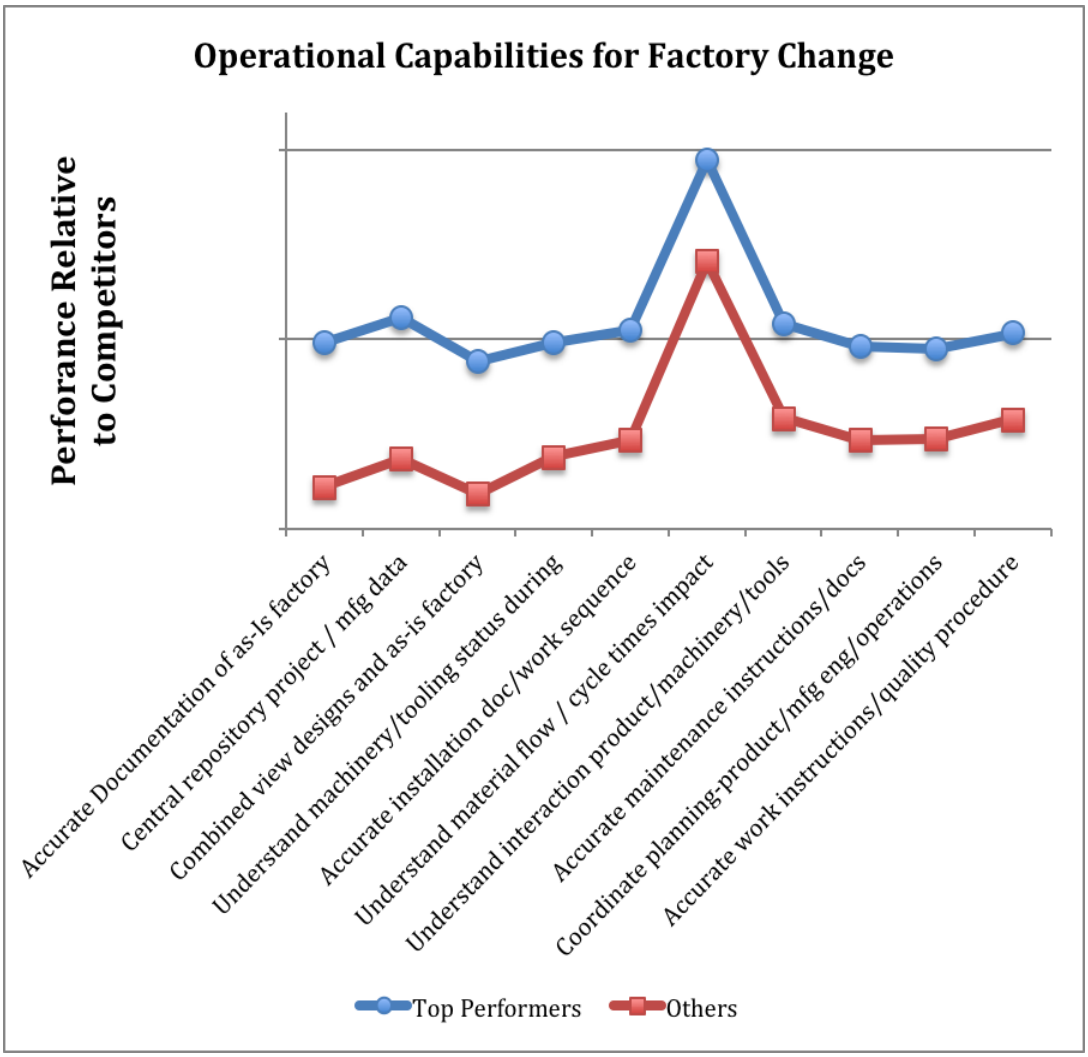

Figure 8: Most Differentiated Operational Capabilities Supporting Change in the Factory

Top Performer Software Capabilities

Top Performers support their best practices and stronger operational capabilities with software functionality. Tech-Clarity analyzed the software capabilities utilized by Top Performers and compared them to those used by Others (Figure 9). Two categories of capabilities were discovered to be more prevalent in the Top Performers.

Simulation technologies help manufacturers predict and optimize the impact and scope of proposed changes during the planning stage to avoid late surprises and optimize designs while options are still flexible.

The first collection of software capabilities found more frequently in Top Performers is simulation. Simulation technologies help manufacturers predict and optimize the impact and scope of proposed changes during the planning stage to avoid late surprises and optimize designs while options are still flexible. The Top Performers are significantly more likely (46%, 56% and 60% respectively) to simulate equipment, material flow, and ergonomics/operator impacts related to change. These capabilities support the simulation processes and capabilities more prevalent in the Top Performers. This is consistent with the conclusion from Tech-Clarity's Issue in Focus: Digital Prototyping in the Plant that manufacturers "need to ensure the changes that they make are right before committing to expensive and disruptive plant modifications."

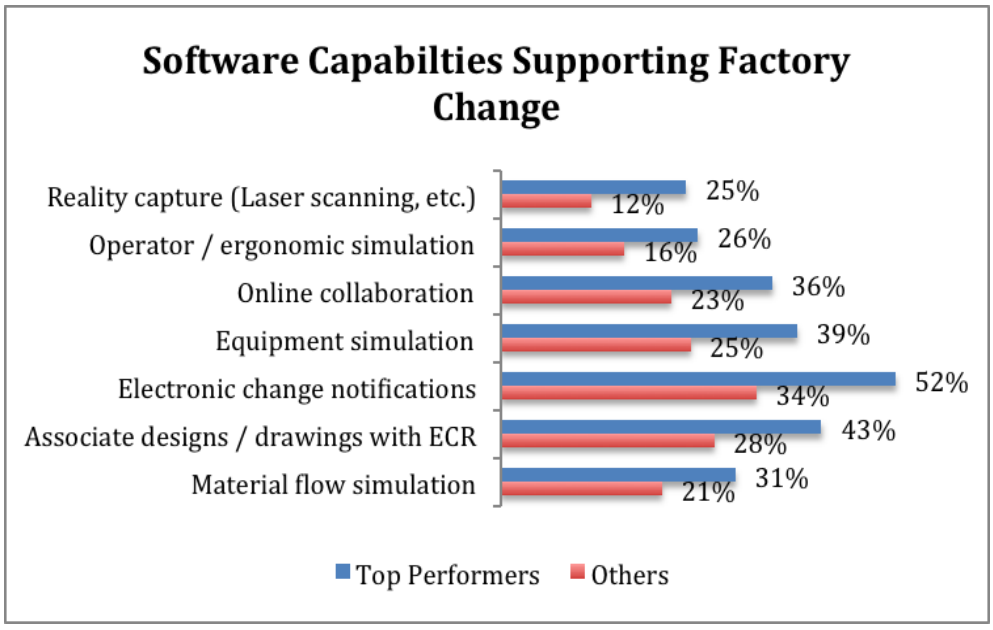

Figure 9: Most Differentiated Software Capabilities Supporting Change in the Factory

The second category of software capabilities utilized more commonly by the Top Performers support communication, collaboration, and information visibility. Top Performers, for example, are 59% more likely to use online collaboration capabilities. They are also much more likely (54%) to have electronic change notification. They are also 51% more likely to associate drawings with ECR, providing additional information and context to those evaluating and executing changes. The capabilities support best practices common to Top Performers, including two of the more common process in Top Performers, cross-functional teams and change control boards. These capabilities also support better impact analysis because impacts can be contributed from various roles across the organization.

The second category of software capabilities utilized more commonly by the Top Performers support communication, collaboration, and information visibility.

One interesting note is that reality capture was the most differentiated capability, with Top Performers slightly more than twice as likely (106% more) to use capabilities such as laser scanning to create 3D digital models. This can be used to support accurate documentation of the as-is factory and support combining new designs with as-is factory into a single view, two of the top three operational capabilities. While this is the most different software capability between Top Performers and Others, it is a relatively new technology and only about one-quarter (25%) are using it, indicating it is an important, emerging technology.

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Top Performer Software Enablers

In addition to identifying the software capabilities in place at the Top Performers, researchers also examined the software solutions providing that important functionality. In this way, the technologies that help differentiate their performance in managing change in the factory can be identified (Figure 10). Similarly to the operational and software capabilities, two themes emerged from the solutions.

The first theme of solutions used more commonly by Top Performers help enable cross-departmental, cross-functional coordination of change at the enterprise level. Specifically, Top Performers are 42% more likely to use PLM and over 3 times more likely to use Building Information Management (BIM). BIM is similar to PLM with the exception that it is focused on infrastructure such as buildings as opposed to products and manufacturing processes.

The first theme of solutions used more commonly by Top Performers help enable cross-departmental, cross-functional coordination of change at the enterprise level.

BIM and PLM support the formal processes that are more common in Top Performers and help enable cross-functional teams, communication, and collaboration. They also enable the second most differentiated operational capability, a central repository for all project and manufacturing data. This can help keep Manufacturing and Engineering coordinated, which is one of the most frequently cited challenges. These tools help associate the right information in context so everyone involved in the change

management process is working from the same information. In a similar way, Top Performers are 47% more likely to use project management software, which helps keep projects in control and manages risk and issues as they arise.

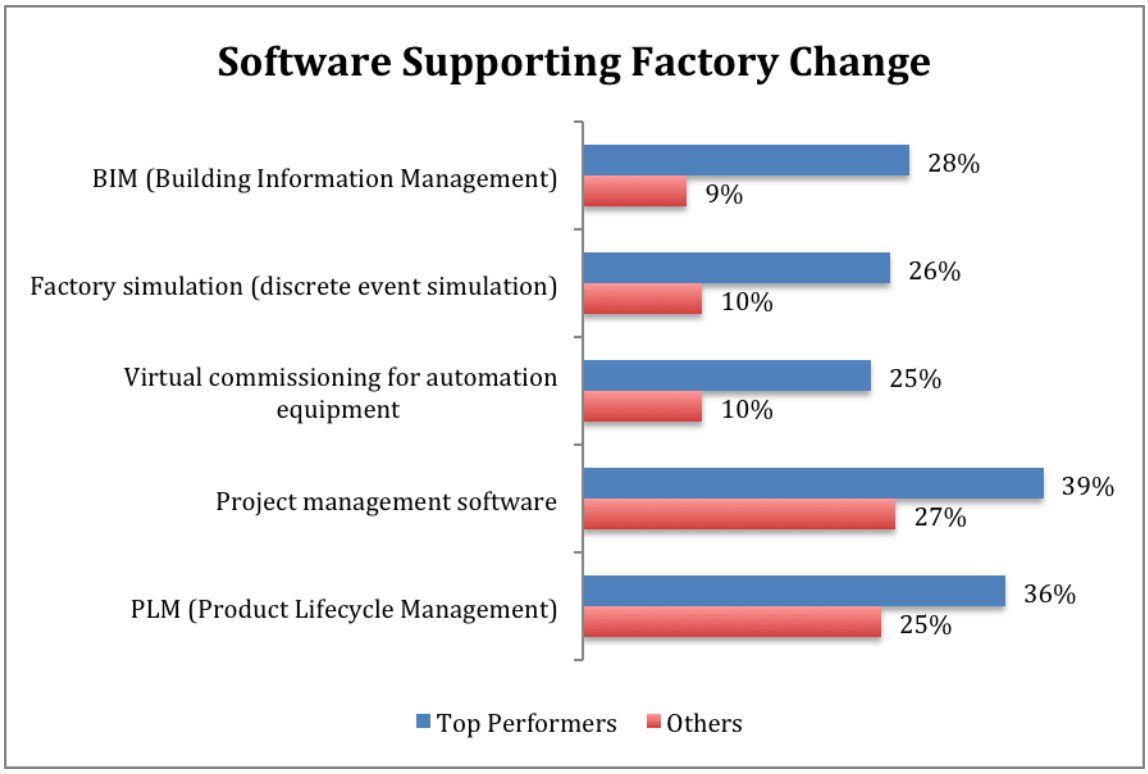

Figure 10: Most Differentiated Software Applications Supporting Change in the Factory

Simulation capabilities are the second theme of software tools. To support simulation, Top Performers are 2.5 times as likely to have factory simulation (discrete event simulation). These tools provide capabilities to support the simulation capabilities including equipment, material flow, and ergonomics/operator simulation. Simulation tools are highly differentiating, helping manufacturers determine the impact of change and enabling them get changes right in a digital environment before committing to physical changes. As Issue in Focus: Digital Prototyping in the Plant explains "Early validation of workstation and line layouts help ensure smooth production in the Factory when modifications are brought online."

Simulation tools are highly differentiating, helping manufacturers determine the impact of change and enabling them get changes right in a digital environment before committing to physical changes.

A couple of other interesting findings came from analyzing the software solutions in use by Top Performers. First, the Top Performers are more likely to leverage integration with automation, which may help reduce errors and speed up programming of automated manufacturing equipment. Specifically, they are more than 2 times (240%) as likely as Others to use virtual commissioning. Finally, Top Performers are 38% more likely to use manufacturing process management (MPM) software. MPM helps manufacturers plan production process and provides a framework to connect products, production processes, lines, operators, and equipment. As a Global Manufacturing Plant Layout Lead Engineer for GM said in Tech-Clarity Insight: Leveraging the Digital Plant, "MPM is one of the biggest enablers in reducing structural cost, but also helps to improve time to market and drive quality up."

Conclusion

Manufacturers have to be agile and lean to compete in today's challenging, global markets. To compete, manufacturers must make change management in the factory a core competency to effectively adapt to market needs and implement quality and efficiency improvements such as those from Lean Manufacturing initiatives.

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Companies change their manufacturing factories frequently, making a variety of sizes of changes. They change for a number of reasons, including tactical measures driving quality, cost, and efficiency to improving competitiveness, but also strategic reasons such as introducing new products and responding to the market. They must make these changes quickly and with the confidence that they can get it right the first time. As Issue in Focus: Digital Prototyping in the Plant reported, "Speed is critical, and agility is the key to profitability. Now, more than ever, manufacturers need be able to make changes in their plants quickly." This makes executing factory changes critical to business performance.

Change is a very challenging process that introduces risk and uncertainty into the factory. This is particularly true for large changes. Put simply, change is hard. Most companies experience project-oriented issues such as missed due dates, overtime, and cost overruns. Factory changes also result in impacts like quality problems, reduced production efficiency, and other negative outcome-oriented impacts that become new, ongoing problems that may themselves require a change.

Top Performers make changes more predictably, better meeting their targets for budgets, due dates, and resulting production volumes.

Fortunately, it is possible to improve change management performance. Some companies do it much better than others, those identified as the Top Performers in this report. They make changes faster, particularly for larger changes that are typically higher risk. Top Performers also make changes more predictably, better meeting their targets for budgets, due dates, and resulting production volumes.

What do the Top Performers do differently? Top Performers employ processes and tools that help them:

- Better understand the full scope and impact of change in advance to avoid late surprises
- Communicate, collaborate, and share information to work as a team more effectively
- Adhere to more formal change management processes

Others can follow the example set by the top performers, adhering to more formal change management processes, implementing known best practices for change management, and supporting their change processes with technology that allows them to collaborate, communicate and share information across departments, and simulate changes before they are implemented. They can also leverage emerging best practices such as reality capture using laser scanning and virtual commissioning. Overall there is good reason to focus on improving change management and the processes and tools are available to do so, as Top Performers use their better processes and tools to create a competitive advantage by having more adaptable factories.

Top Performers use their better processes and tools to create a competitive advantage by having more adaptable factories.

Recommendations

Based on industry experience and research for this report, Tech-Clarity offers the following recommendations:

- Implement and adhere to formal change management processes
- Follow known best practices such as change control boards, cross-functional change teams, and formal impact analysis

- Leverage processes and tools to improve communication, collaboration, and information sharing including enterprise tools such as BIM and PLM as well as project management
- Adopt processes and software to simulate material flow, operators, and equipment to understand the full scope and impact of changes, optimize resulting performance, identify issues early, reduce risk, and get changes right the first time
- Consider adopting reality capture technology such as laser scanning and overlaying intended changes on top of an accurate "as-is" model

About the Author

Jim Brown is the President of Tech-Clarity, an independent research and consulting firm that specializes in analyzing the business value of software technology and services. Jim has over 20 years of experience in software for the manufacturing industries. He has a broad background including roles in industry, management consulting, the software industry, and research. His experience spans enterprise applications including PLM, ERP, quality management, service lifecycle management, manufacturing, supply chain management, and more. Jim is passionate about improving product innovation, product development, and engineering performance through the use of software technology.

Jim is an experienced researcher, author, and public speaker and enjoys the opportunity to speak at conferences or anywhere that he can engage with people with a passion to improve business performance through software technology.

Jim can be reached at jim.brown@tech-clarity.com. You can read additional research, watch Tech-Clarity TV, or join Jim's *Clarity on PLM* blog at www.tech-clarity.com. You can also follow Jim on Twitter at @jim_techclarity, watch him as a "dueling analyst" in the Tech4PD web show on Engineering.com, or find Tech-Clarity on Facebook as TechClarity.inc.

About the Research

Tech-Clarity collected data via an online survey for this report. Respondents were recruited through direct outreach, social media, and in partnership with Penton Media. Tech-Clarity also partnered with Business Advantage who conducted phone interviews across the globe. A total of 256 qualified respondents answered the survey, of which 226 provided enough information to classify them into performance bands as "Top Performers" or "Others."

The respondents were comprised of companies that receive 10% or more of their revenue from a mix of industries. The industries represented are primarily discrete manufacturing businesses, including 45% Industrial Machinery, 35% Auto, 23% Durable Consumer Goods, and others from Aerospace, Building Products, High & Electronics, and others.

Note that the percentages total over 100% because respondents were allowed to indicate they served multiple industries.

Survey respondents reported producing their products in factories in a wide variety of locations, representing a strong global respondent base. Geographies where they product 10% of more of their products include 41% Western Europe, 40% China, 30% North America, 21% Japan, 18% Korea, 15% Eastern Europe, 11% India, 9% Latin America, 9% Australia, and 7% Africa. Note that the percentages total over 100% because many companies manufacture in multiple geographies and were asked to report any they produced 10% or more of their products.

The survey also represents companies that include a good distribution of different sizes of manufacturers. Specifically responding companies have 1-100 employees (23%), 101-500 employees (23%), 501-1,000 employees (11%), 1,001 - 5,000 employees (20%), 5,001-10,000 employees (11%), or over 10,000 employees (13%).

Responses include a strong representation from the managerial level. Specifically respondents were Executive, "C-level", including titles of CEO, CFO, COO, and others (10%), Vice President level (4%), Director level (21%), Manager level (57%), Non-manager, staff, individual contributor (7%), or Other (1%).

Finally, the survey responses came from a good representation of people involved in managing change in the factory, including a variety of departments/functions with a high concentration in Manufacturing (25%) and Engineering (38% in total, represented by different functions including Industrial / Manufacturing Engineering (18%), Design Engineering (16%), and Factory/Facilities Engineering (4%)). Respondents also represented included Information Technology (9%), General Management (7%) and others including Sales and Marketing, Quality, Accounting and Finance, Supply Chain / Logistics, Procurement, and others.