



Competing with the Truth:

Master Data Management in
Discrete Manufacturing

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Executive Summary

IN DISCRETE MANUFACTURING the demand for innovation and the increasing complexity of the business are testing the limits of today's corporate information systems. Global supply chains, regulatory pressures, compressed product development cycles, upstream channel information requirements, and cost pressures all require accurate and timely customer and product information and a cradle-to-grave view of supply chains. The inertia of information islands within manufacturers prevents a rapid response to these new business pressures, leaving manufacturers hamstrung when they attempt to do the right thing with the wrong data. Discrete manufacturing, like every industry, needs to think global and *act* global to reach the next level of productivity. Firms need to integrate their processes with customers and suppliers who are increasingly emerging as competitors, while re-thinking how they engage end-customers, deliver products, and create new opportunities. It takes good information, and lots of it, to operate effectively in such a sea of priorities.

Accurate, timely information has become a competitive advantage, and IT must enable as well as align with overall corporate strategies. At NIBCO, a manufacturer of flow control products, improving data accuracy helped reduce invoice reconciliations from \$1.4 million a month to just \$100,000.¹ At Toyota, designing for manufacturability (ensuring products can be ergonomically assembled) helps advance the company's goal of zero changes for production drawings—impossible without accurate shared data.

Master data management offers new processes and tools for resolving data discrepancies and bridging information islands. *Master data management* is a set of tools, techniques and governing principles for the capture, control, verification and dissemination of critical reference data (e.g. data about customers, suppliers, products, and employees). Master data management resolves the chaos of inconsistent databases, dueling spreadsheets, and other data anomalies by defining, populating, and disseminating a single consistent “actual version of the truth.” A coordinated approach for arriving at good master reference data creates the information foundation for the next level of cooperation now required by the firm. Markets increasingly demand that companies collaborate with other enterprises in dynamic *business webs*. New distributed technologies (e.g. Service Oriented

Architectures) allow information systems to communicate beyond corporate walls.

In a companion paper, we discuss why redundant and inconsistent data, once tolerable within the firm, is now a serious impediment to business and an executive level issue.² We also outline some important new tools and techniques that are emerging to address the issue; specifically, the rise of master data management. This paper discusses these challenges and issues in relation to the discrete manufacturing industry. Good reference data is essential to cross-functional innovation and inter-corporate collaboration. Without the right master data, everything from electronic bills of materials, to co-authoring designs, to joint decision making, and even negotiating with suppliers can be impaired.

1.0 Untruthful Data in the Discrete Manufacturing Industry

1.1 Competitive Forces, Past and Present

A transition is occurring in manufacturing: from merely making things to innovating them. Samsung CEO Jong-Yong Yun believes agility and innovation are at the epicenter of competitiveness: “In the digital era, creativity and speed have become the most important factors.”³ You can't innovate if your data is organized in silos, says Dell Chairman Michael Dell: “Collaborative R&D between IT buyers, vendors, and partners is central to future innovation.”⁴ The earlier the collaboration starts the better. According to AMR Research, by the time a product is designed, approximately 70% of its costs have already

“In the digital era, creativity and speed have become the most important factors.”

been determined. “It's a cooperation between product development, product planning, and marketing from the very beginning, which adds speed overall,” says Jong-Young Yun, “Faster development of technology means that product development and the supply chain have to be faster in order to respond.” A Deloitte Touche Tohmatsu survey asked manufacturers to identify the top five revenue drivers in the next three years. “New product and

services launch” was the first choice (89% of respondents).⁵

Collaboration has become more challenging for manufacturing as the enterprise and its information have become more complex. Those adept at managing and optimizing all of the pieces enjoy a competitive advantage. Some of the issues and priorities that manufacturers are juggling include:

- **Developing and innovating new products:** Average revenues from new products (less than three years old) is expected to grow from 27% of revenue in 2003 to 31% of revenue in 2006. The best firms require, on average, 3.5 product concepts to create one commercial success (all others require and average of 8.4 concepts per success).⁶
- **Focusing on Product Lifecycle Management (PLM):** An integrated cradle-to-grave approach to products improves efficiency and encourages innovation. In 2003, 45% of manufacturers said they used product lifecycle methodologies and 27% used product lifecycle software.⁷
- **Outsourcing:**⁸ Manufacturers outsource portions of their manufacturing activities (67% outsource), distribution activities (58%), and engineering services (62%). In North America, 15% of firms do not manufacture products in their own markets (29% in Europe).
- **Improving time-to-market:** In some industries (e.g. consumer products), the first product to market can generate 33% more revenue than the second and 53% more revenue than the third. Creating new products is much more profitable than copying them.
- **Complying with regulations:** International language issues, safety and other standards, labeling, and environmental and reporting requirements must all be carefully managed.
- **Navigating cost and efficiency pressures:** Lean manufacturing, Total Quality Management (TQM), Kanban, Just In Time (JIT), Design For Manufacturability (DFM), and Material Requirements Planning can all yield cost and efficiency improvements.
- **Managing customer and supplier relationships:** Negotiating power within supply chains requires

good information. Business intelligence applications that help manage supplier relationships can offer substantial benefits says David Newman, Research VP, Gartner: “Results from such efforts can yield between 20–30% savings from volume discount programs.”⁹

- **Controlling and managing intellectual property:** Careful management of IP helps establish a legal basis for claims and ownership. Unequivocal well-documented processes for distribution, access privileges, and security, are essential for managing and protecting core intellectual property.¹⁰

Competitive firms must answer these business pressures, but the complexity of the challenge is straining the limits of their corporate information systems.

1.2 Data Problems Emerge as the Key Inhibitor to Growth

Product innovation is often a tradeoff between what can be imagined and what can be delivered, and senior management must have accurate and timely data to know what can be delivered. Inconsistent data is stranded on information islands scattered around the firm. Departmental applications, multiple customer information files (CIFs), Excel spreadsheets, email messages, printed reports, third party sources, and other database inconsistencies give various versions of the “truth” and impede strategic decisions on product innovation.

“Inconsistent data is stranded on information islands scattered around the firm.”

Unfortunately, there’s a big gap between manufacturers’ priorities and the capabilities of their information and supply chains. So while 89% of manufactures indicate that new product development is a priority, 73% don’t have the product lifecycle software to support it. And in order to be effective, Product Lifecycle Management (PLM) software requires careful attention to master data management. Quality reference data is foundational to reliable information exchanges that span the product lifecycle. In the worst cases, critical information such as design drawings exist only in hard copy—“master data” about the product is often physically affixed to the front of the drawing itself. Though much of this information now

exists in electronic form, the information systems that contain it are usually disconnected from one another. George Young, founding principal at professional services firm Kalypso says, “That’s where companies are struggling: ‘how do I put all this mess together?’”¹¹ A manufacturer that has grown through acquisitions may have twenty different CAD programs and a host of point-solutions: two or three Product Data Management (PDM) systems, two or three Product Lifecycle Management (PLM) systems and two Enterprise Resource Planning (ERP) systems. Many of these systems begin with the ambition of creating a single version of the truth for the enterprise, but without master data management you simply create another set of inconsistent data.

Young agrees that things have improved since the days of paper design drawing but, he says, sharing electronic information is still a major barrier: “You’ll see a prototype with yellow sticky notes being dropped into a company mail and then overnighted—it’s just a mess.” And for many engineers and scientists, old practices die hard. Existing processes are mimicked and repeated in digital information systems. Where product information was once attached to the front of a design drawing, we now see the electronic equivalent: digital files “attached” to CAD drawings. Having all the information bundled in one place makes sense for the designer, but it’s hard for others who share the information to update or change it. Even when information systems are connected, they may still be unable to communicate. Without a lingua franca of common data definitions and values, systems won’t “talk” to one another.

“You’ll see a prototype with yellow sticky notes being dropped into [the] company mail.”

1.3 The Costs of Disconnected Data

Many of these unresolved data and information issues come with a cost. Some examples:

- **Higher design and manufacturing costs:** Without electronically searchable information, it’s easier but more expensive to design and manufacture a new part than to find and reuse an existing one.
- **Difficulty complying with regulations:** Without information about existing components and their

providence, complying with regulations like RoHS (a European directive for identifying hazardous substances in products) can be prohibitively expensive.

- **Inefficient management of supplier relationships:** In electronics manufacturing, component pricing can change rapidly. A board manufacturer may negotiate good component pricing today, “but if the owner of the property doesn’t look at what the current costs of that board are after months or years of production, the contract manufacturer could be making a very substantial profit on it.”¹² You can’t benefit from component price decreases without an automated tool with access to component-level design data.
- **Adding product complexity:** If you don’t have the information you need to reuse existing parts, product complexity, manufacturing costs, time-to-market, and maintenance costs all increase.

Without common reference data, it’s impossible to share information between firms with confidence. While many discrete manufacturers have adequate controls on their own data (and may even adequately share it within corporate walls), the most progressive discrete manufactures are collecting, standardizing, and sharing data across the supply chain—shortening product lifecycles, accelerating innovation, reducing complexity, and optimizing time-to-market.

2.0 Master Data: A New Solution

2.1 Barriers to Strategic Data Management

The chaotic hairballs of corporate data flow diagrams date back thirty years, and many a project has tried and failed to unravel them. It used to be that manually synchronizing data was tolerable. System design was a trade-off between actual business requirements and the hardware, network, and people costs. Expensive, unreliable networks made it cheaper for many departments to create, control, and manage the product, customer, and other data most relevant to them. Marketing would own product packaging, manufacturing would manage certain design data, and engineering would handle others. Today that cost/benefit data equation has been reversed. Using human middleware to synchronize data is much more costly than the network and systems that could keep them unified.

The Internet is a cheap, fast, reliable way to connect the world's computers, and reliable high-speed global bandwidth is now nearly free. But connectivity isn't much use if the logical and semantic standards are not in place to communicate. If my 10-inch Iron pushrod and your identical 254mm Fe pushrod have different reference numbers, we will (erroneously) conclude that they are two different parts.

Enterprise Information Architectures, of which master data management is a critical component, is now strategic. As businesses become *information businesses*, fluid congregations of networked businesses (business webs) and supply chains predominate, and data issues become business issues. The firm with the best data wins.

In an ideal world, a firm could learn from its mistakes and re-architect and rebuild new systems from the ground up. Unfortunately, you can no more hit the "pause button" on your business and start from scratch than you can take a nap while you're driving on the highway. An alternative approach is to move to a single vendor's package, but that can compound the problem if it introduces yet another set of potentially inconsistent data or ignores the realities of heterogeneous computing environments. Firms may also risk losing their source of competitive differentiation by conforming to a vendor's process and approach. Others have made inroads by extracting, transforming, and loading the inconsistent data into a more consistent data warehouse. By making "best guesses" for data reconciliation and consolidation, senior management get a new and more complete view of the enterprise. Very powerful at a summary level, but the "garbage in, garbage out" maxim still applies: these "best guesses" preclude using the new warehouse as a Production Data store or at times even for Corporate Performance Management.

What's needed is an approach that reduces complexity, remembers discrepancies resolved, and moves you towards harmonizing disparate data sources without hitting the pause button on your business.

2.2 The Path Forward: Master Data Management

Leading companies are addressing master data management issues to create sustainable competitive advantage. They understand that common reference data is a prerequisite to survive and thrive in the new collaborative economy. Depending on the need, master data management can help simplify product creation and

manufacturing, enabling greater levels of innovation and configurability with reduced complexity. Without MDM, chaotic data becomes a significant impediment to business, driving up costs, slowing and confusing communications, and hobbling your relationships with customers and suppliers. Can you trust an organization whose communications are based on untrustworthy data?

"Can you trust an organization whose communications are based on untrustworthy data?"

A comprehensive master data management strategy and implementation must be able to eliminate the noise from unreconciled databases, "dueling spreadsheets," and other insulated information systems that all believe they own the "correct" version of the truth. Master data management is the pursuit of the single, correct version of the truth that enables better, faster decision making within the firm and seamless integration with partners outside corporate walls. Master data management helps enable investments in distributed technologies like Web Services and Service Oriented Architectures that make integration easier and support dynamic business relationships. Clean reference data is a prerequisite for these collaborative efforts and essential for unambiguous communication.

2.3 The Rewards for the Discrete Manufacturing Industry

As efficiencies on the factory floor approached their logical limits and commodity margins thinned, manufacturers began looking elsewhere for revenue, savings, and efficiency gains. Design for manufacturability was an important step in that direction. Knowing that so much of a product's cost is tied to design, companies embed constraints into the design process to ensure it creates something the plant is capable of producing. George Young of Kalypso argues that effective data management combined with the right design and engineering philosophy get you to "a simplified design which is easier to manufacture, lower cost to produce, and then easier to service."¹³

The next logical frontier is Product Lifecycle Management, an integrated cradle-to-grave view of a product that not only lowers manufacturing costs but also improves the design based on information about customer

requirements and actual product usage. Achieving this cross-enterprise view of products throughout their lifecycle allows manufacturers to:

- **Optimize decisions:** Supply chain complexity has increased with global sourcing, built-to-order, and regulatory requirements. To manage that complexity, firms need to improve their decision making processes to juggle and optimize more variables. The frequency and quality of decision making depends on the timeliness and quality of data available. Says Peter Storti, principal at Kalypso, “if you’ve got to dig all this information out manually, there’s no way you can get as much information as you would want to make the decision—it’s cost-prohibitive.”¹⁴ Without access to consistent and accurate data, much manual effort goes into reconciling and understanding data anomalies. Consistent and accurate master data allows you to automate portions of your decision making: you can make better, quicker, and more profitable decisions.
- **Accelerate innovation:** New products are a growing proportion of manufacturing revenues (from 27% to 31% in the last three years), and time-to-market pressures are more intense. Collaborating on product innovation requires cross-enterprise information sharing. Sharing accurate reference data increases work conducted in parallel (e.g. marketing has access to early line drawings) and even enables portfolio management approaches to new product introductions. The result is faster time-to-market and higher commercialization rates for new products: innovation accelerates. For many discrete manufacturers, the ability to lead innovation is a competitive advantage. Component manufacturers for example, use innovation to maintain their own balance of power in the supply chain. In a recent interview, Samsung’s CEO was asked whether he would rather have the Apple brand or Intel’s thriving semiconductor business. His response, predictably, was “both.” However, he points to the strategic leverage that Samsung’s technical prowess—its ability to innovate—yields: “if you have that sort of technological competence, you can always get brand equity.”¹⁵

“New products are a growing proportion of manufacturing revenues.”

2.4 Managing Data: Discrete Manufacturers Attack the Problem

Industry leaders realize that master data management *software* is not a technological silver bullet that will slay data problems. A successful master data management *strategy* requires manufacturers to rethink the collection, governance, and redistribution of data. The creation and management of global master data touches every aspect of how an organization works, sometimes colliding with long established silos. But where some see disruptive risk, others see reward: this very collision and resulting rework reveals new sources of value creation.

Companies from Rubbermaid and GE to Nortel, NIBCO, and Toyota are tackling master data management issues to improve channel visibility, reduce costs, and drive innovation:

2.4.1 Rubbermaid

Improved channel visibility and relationships are key objectives of Rubbermaid’s master data management strategy. Rubbermaid has relationships with hundreds of different distributors, each with unique information requirements and many with their own databases. A master data management system allows Rubbermaid to make a smart transfer of information to distributors. Says Joe DeZarn, Director of Marketing Communications, Rubbermaid Commercial Products, “When you go to market through distribution, every one of those distributors is relying on our company to provide them with accurate, timely, and complete information. If they don’t know about it and don’t have it right, they can’t sell it. With that business model, we have to have a way to control, manage, and deliver our data.”¹⁶ The ability to provide accurate data to channel partners sets Rubbermaid apart from competitors. Says DeZarn, “We have gone from being—like most of the other manufacturers—pretty good at delivering most of the information most of the time... to being very good at delivering all of the information all of the time.”¹⁷

2.4.2 General Electric

General Electric focused on master data management to consolidate product information within its appliances division. Like Rubbermaid, GE needed to publish accurate product information in a way that met unique customer requirements. GE's master data management system also helps improve new product launches. Product teams and creative agencies have specific content that needs to be developed in a certain timeline (e.g. images, documentation, line art, and marketing messages). Says Leslie Hagan, Content Management Leader, GE Consumer & Industrial, "We want ... our sales people, specifically on our contract channel or building channel, to be able to view preliminary specifications on our products six months before [they're] available [for purchase]." Now new products can be inserted into GE's master data management system and labeled "preliminary." The result is new time-to-market opportunities. Inserting product information into the master data management system as early as possible lets GE collect important feedback from the field and the market to improve the product, its creation, and its distribution.

2.4.3 NIBCO Incorporated

At NIBCO, a privately held manufacturer of flow control products for the construction industry, effective data management has improved efficiency and customer service. For example, a "single version of the truth" made a significant difference in the area of "remittance deductions." Before MDM, if a customer disagreed with an invoice, the difference was charged back to NIBCO in the form of remittance deductions. These deductions were worth \$1.5 million a month and required a staff of ten full-time employees to reconcile the differences. The write-offs were high as well. Says Rex Martin, President and Chief Executive Officer of NIBCO, "Five hundred dollars or less, [and] we'd take the customer's word."¹⁸ Accurate data shrank those remittances to just \$100,000 a month (generating cash of \$1.4 million monthly) and the staff to handle remittances has been reduced to two full-time employees.

Another significant data issue has been the consolidation of product information throughout the company. One of the company's significant points of differentiation is vendor-managed inventory, according to Rex Martin: "every time we put a customer on, we've

doubled their inventory turns. We're able to cut their inventory in half. This is a huge selling tool for us in the marketplace. We are perceived as the leader."¹⁹ A site serving customers, partners, vendors, and internal personnel is an important relationship management tool. The challenge, according to Rod Masney, then-director of IT strategy, was that, "the site's existing catalog-search engine just wasn't robust enough to allow our customers to find product data quickly and accurately." To improve search capabilities, the company consolidated product information held by different groups in the company to create a single master data management system with information about all 18,000 NIBCO products. Says Rod Masney, "retailers and distributors that need a part in a hurry have made extensive use of the system. In just seconds they can find what they need and place the order online. Not only has their search time been cut from minutes to seconds, but the quality of the search results has also improved considerably."²⁰

2.4.4 Nortel

At Nortel, a global IT rollout is designed to integrate the company's information systems across all regions and divisions of the company. An integrated approach with shared master data will support the company's transparency objectives and remove costs from Nortel's supply chain. Nortel already had some homegrown master data management processes in place for data areas such as customer and vendor parts, items, and units of measure. The global IT rollout is an opportunity to replace this homegrown system with a more comprehensive master data management product. This master data management system offers new capabilities (e.g. it accommodates HR's organizational hierarchies) and will collapse a handful of systems into a single master data management solution. So far, the experience has been a positive one. The company has found the application one of the easiest software products that it has implemented. What comes standard "out of the box" is usable and the customization requirements have been far less than in other areas. The company expects that the new master data management system will reduce cost and improve service. Says Nortel's Gabriele Bauman, SAP Technology Lead at Nortel, "The number of systems and the number of interfaces that we're reducing are quite significant, and we expect to lower our SG&A [Selling, General, and Administrative] costs."²¹ Providing a single face to the customer will also be important. An integrated system

where people can look into one system instead of several creates a streamlined process that can improve customer service. Fewer invoicing errors and greater order accuracy means higher customer satisfaction.

2.4.5 Toyota

Toyota has long been a leader in manufacturing and production. The company's pioneering Just In Time practices allowed the company to survive a tough economy early in its history and propelled it to global leadership in the automotive sector. High parts commonality between the company's models has significantly reduced costs and manufacturing complexity—such gains would have been impossible without good information on parts and collaborative design processes. Today, information technology plays a key role in driving those efficiencies even further by linking the company's manufacturing operation directly with new product design through what is called “digital assembly.” Before any prototype parts are even produced, digital assembly allows parts to be “virtually” assembled

“High parts commonality between the company's models has significantly reduced costs and manufacturing complexity.”

by simulation. Such simulation supports Toyota's goal of “zero change” from its production drawings. The result is fewer engineering changes during product development, the ability to send some parts directly to production without prototypes, and improved manufacturability since designs are assessed on whether “they could be reliably put together by workers under ergonomically correct conditions.”²² Without accurate data on product designs and manufacturing requirements, this type of “digital assembly” would be impossible.

These examples highlight industry leaders' progress on master data management issues. The same benefits are available to small and large manufacturers alike, and every firm has much to gain by reconciling its islands of information to improve efficiency and drive innovation.

3.0 Master Data: Making It Happen

Successful companies have clear objectives for their master data management initiatives and take an incremental approach with step-by-step global rollouts. Recent advances in software facilitate early wins that can build the business case for a rollout throughout the organization.

While every MDM implementation is different (in scope, process, and business objectives), several common lessons emerge:

- **Treat MDM as a business issue, not an IT issue:** Making specific links between master data and business imperatives is important to gain management buy-in.
- **Consider the Total Cost of Ownership (TCO) equation:** Poorly managed reference data is a major cost of today's information systems—these systems aren't flexible or comprehensive enough to accommodate today's need for product data (for example) and customer data needs tomorrow. Careful management of customer, supplier, product, and employee data is critical for TCO improvement. A comprehensive solution and methodology that can accommodate all types of data, and the inevitable changes in its structure down the road, can minimize TCO and provide better value.
- **Make Services Oriented Architecture (SOA) a reality:** To reap the benefits of SOA, you must get reference data right. Business users should be able to build composite processes or re-engineer existing processes by leveraging all reference data and embedding it into processes.
- **Pay attention to your people:** Managing people's roles in information management is more important, and often more difficult, than the technology issues. For example, designers and engineers accustomed to traditional processes and systems may resist new collaborative design approaches.
- **Have the courage to break the mold:** Don't just automate existing processes. Use master data management to unlock new opportunities for information reuse and sharing and collaboration. It's a more challenging approach, but essential to realizing the business benefits of your initiative.

- **Unearth all relevant data stores and owners in the organization:** If the rest of the organization doesn't know about it, fragmented data will stay that way.
- **Make the data ubiquitous and accessible to composite processes as well as end users:** A successful solution must make master data easy to see, access and use (e.g. through the intranet). Those without access to master data will maintain their own versions.
- **Create a “discipline” of master data management with ongoing, centralized management to ensure it becomes a living process:** Capturing and then reentering once to verify critical data can help you avoid reconciliations later.
- **Identify, standardize, clean, and harmonize master data—in that order:** Standards are not just about the data structures; they need to go to the instance level to ensure that my part number 10007 is not your part number 70001.
- **Standardization is not “identicalization:”** The benefits of standardization must be balanced with the flexibility to meet linguistic and other local needs. Standards should not dampen innovation or eliminate useful forms of differentiation.

3.1 Starting the Process: Dealing with the Human Element

The very nature of master data requires the breakdown of long-established silos and processes. Peter Storti of Kalypso agrees: “[Master data management] is more an organization, cultural, management, work process, business process issue, than it is a technological issue.”²³ The organization needs to be fully involved. It's not easy, says George Young of Kalypso: “The biggest barrier is probably human nature. No one wants to give up the tools they currently use even though they can understand the broader goal of having information that can be shared. Scientists and engineers are emotionally attached to their CAD and formulation systems.”²⁴ It is often tempting to keep an obsolete tool rather than learn a new one. Those emotional attachments can become barriers to information sharing.

Many companies don't immediately recognize the relationship between the quality of data and the business

benefits that it yields. Conflicting data definitions and instances have existed in the firm for decades. Reconciliation problems between departments have been either accepted or ignored. But in a collaborative world, firms cannot have differences of definition. And before you can tackle master data management issues between firms, your own stakeholders have to agree that it's important to get the internal data right. Engineering, IT, and manufacturing speak very different languages and operate in different worlds. It won't work if just one of these camps recognizes the problem and tries to solve it: all three need to agree that there's a problem and learn to speak a common language. Only then can your company collaborate with others in the marketplace.

Building the “common language” for the organization is the most difficult part. But leading practitioners have developed a few rules of thumb:

- **Break the problem into manageable pieces:** As the number of people involved in the decision increases, it becomes harder to agree. One way to solve this problem is to break up the problem into manageable pieces. You reach decisions on different parts of the solution with smaller groups of people and then stitch them all together.
- **Start with the low-hanging fruit:** Focus on “the simplest implementation that will deliver tangible value,” advises Peter Storti.²⁵ That means projects that are 3–9 months long, not 18–24 months. If the project is too long and the benefits too distant, a continuous stream of new requirements could scuttle the project.
- **Focus only on useful differentiation:** Most companies start out looking for an off-the-shelf solution. But they then customize so extensively that they can't take advantage of the vendor's upgrade path, which means they've effectively created another legacy system. In general, 80% of an organization's activities are “commodity” processes and just 20% uniquely differentiate them competitively. Avoid customizing to accommodate a commodity process. Aim for a package that's flexible enough to meet your unique needs *and* leaves you the option of vendor upgrades.
- **Avoid risky “big bangs:”** Only in the rarest circumstances will a sink-or-swim approach succeed. More often, a staged implementation with incremental results is much more effective because

companies learn as they go and build momentum with early successes. In the past, master data initiatives required “big bang” efforts to switch from one set of data definitions to another all at once. Today, powerful new software tools and processes offer more realistic iterative approaches that can gradually untangle your data.²⁶

“If the project is too long and the benefits too distant, a continuous stream of new requirements could scuttle the project.”

3.2 Data Management: Have the Courage to Break the Mold

Data problems don’t fix themselves: you must have stakeholder buy-in. The path of least resistance is often to automate existing processes, but you shouldn’t stop there: master data management has the potential to unlock new opportunities for information sharing and collaboration. Trying new approaches is more challenging, but you have to be willing to break the mold to realize the business benefits.

The goal isn’t to make each data user happy, but to find the common ground between them. What makes the draft person’s job easier isn’t always best for the organization, and sometimes jobs and roles must shift. Without these changes, your implementation may succeed, but you’ll miss the larger benefits of master data management.

Peter Storti encountered a situation in which the rollout of a new Product Lifecycle Management system catered to the whims of its designers.²⁷ Management asked designers—who had only recently made the switch from drafting boards to computers—to identify the features they wanted included in the new PLM system. Because these designers only thought in terms of drawings, they highlighted the importance of being able to revise their drawings and automatically generate title blocks on them. But thinking only in terms of design drawings was really a function of being stuck in the past; current best practices rely on CAD models that can eliminate the need for most of today’s drawings. The designers and management didn’t pay enough attention to the potential benefits of sharing and searching design information, or even entirely new possibilities like building in design constraints or

rules based on economic or manufacturing constraints. Technology was changing the jobs of designers, and the organization wasn’t addressing this change. Customizing the application to optimize the drawing process cost the company time, resources, and on-going maintenance effort and also eliminated the potential benefits of CAD models. To realize the benefits of the new technology, the designers needed to be retrained and business processes needed to be updated to use the functionality of the latest CAD tools.

Successful implementations are not easy, and you need a clear vision of the end state to sustain them, says Ed Toben, CIO, Colgate-Palmolive: “You’ve got to make it simple because quite frankly it’s too hard.”²⁸ However, master data management products have progressed significantly since the first homegrown master data solutions began to appear. Vendors have developed a new generation of master data management applications and processes to accelerate and simplify the process. These include tools to reduce the number of manual processes required to consolidate and cleanse data, mitigate duplication, and simplify data manipulation and maintenance. Taking advantage of vendors’ expertise can save companies from having to reinvent the wheel.

3.3 Immediate Benefits

The Bob Dylan approach to business cases (“You don’t need a weatherman to know which way the wind blows”) isn’t enough for most CEOs, especially when it comes to investing in information technology. CEOs want evidence that investments can, have, and will pay off. The business case for master data management is compelling. Our research shows that discrete manufacturers can:

- **Improve cycle times:** Effective collaboration and information sharing across marketing, engineering, manufacturing, and IT helps compress new product development cycles and improve speed-to-market. Instead of waiting for “handoffs,” a single view of information (e.g. marketing receives a preview of “draft product specs”) can increase the ability to work in parallel and reduce time to launch.
- **Boost commercialization rates:** Effective collaboration among departments and a view of information across product lifecycles can produce more relevant new products and higher commercialization rates. Better information also allows firms to take a portfolio approach to new

product development—new information can be used to cull some products before they hit the finish line, or accelerate others.

- **Lower product costs through simplification:** Reuse of parts (e.g. Toyota strives for 80% common parts in its automobiles)²⁹ can be enforced by information rules and constraints enforced at the design stage. Simpler products reduce design effort, lower manufacturing costs, save on scrap/rework, decrease maintenance, and lower warranty claims.
- **Reduce costs of regulatory compliance:** Easily accessible product, material, and design data require less effort for RoHS and other product reporting requirements. Even when parts must be lab tested, accurate master data reduces expenses by identifying which parts are composed of unique materials and which are not.
- **Improve negotiating power:** Many businesses use volume discounts and bargaining power that comes with better information to justify their master data initiatives or the PLM investments that master data help enable. In board manufacturing, for example, wide fluctuations in component prices make it essential to capture and analyze design information at the component level.
- **Decommission information systems:** An effective master data management system can help harmonize, and in some cases replace, siloed information systems within the organization.

3.4 Long Term Rewards

Strategic initiatives such as product lifecycle management and the master data underlying them have tangible financial benefits, but the connection to business objectives isn't widely recognized. According to Storti, no CEO has stood up and said, "Our company is alive because of PLM." It doesn't become that obvious. There isn't the poster child for it."³⁰ For many companies, only a burning platform or business imperative can catalyze a master data management initiative. Competitive threats and business failures can make the significance of master data management painfully clear. Says George Young, "It's an illness that gets traced back to master data. ... It is not sexy. It is really important, but until you have been victimized by it you probably don't know why."³¹

Master data initiatives that get off the ground usually support an organization's strategic business imperatives, says George Young:

My experience is that usually the business case is developed as an exercise to support an intangible that is indisputable. There have been some cases where companies have said, 'We're kind of interested in this. Put together the business case' and we have done this, but in my experience if it really comes down to dollars and cents they won't go forward that often.

The challenge is for firms to link the dots to master data management *before* catastrophe strikes. In many cases, awareness of the master data issue already exists within the organization, but the difficulty of solving it causes management to avoid the issue. An impediment for many

"It is not sexy. It is really important, but until you have been victimized by it you probably don't know why."

companies is that master data is "three levels down into infrastructure" says Filippo Passerini, CIO at P&G.³² It's an issue that strikes so broadly and deeply within a firm that lone departments may be ill prepared to tackle it alone. Organizations like P&G have mobilized themselves to tackle the problem, but not every organization is equipped for that type of collaborative effort. IT, manufacturing, and engineering must all work together to tackle master data management issues. Even inter-enterprise collaboration may be required. Data problems may manifest themselves in many ways, but the business benefits of master data management are indisputable for the firms that have managed to overcome them.

A company that's come out of a major product launch, faced a major competitive threat, or dealt with a regulatory catastrophe *knows* the costs of poor master data management. For some companies, it's about maintaining their "license to operate." Says Young, "many times the decision to fund master data management is made because somewhere at the top levels of the executive ranks they realize that if they have a problem related to compliance it's a catastrophe."³³

4.0 Going Forward

Discrete manufacturing, like every industry, needs to think global and act global to reach the next level of productivity. Firms need to integrate their processes with customers and with suppliers who are increasingly emerging as competitors, while re-thinking how they engage end-customers, deliver products, and create new opportunities. It takes good information, and lots of it, to operate effectively in such a sea of priorities.

For discrete manufacturers, the points of pain—and opportunity—are supply chain complexity (an inaccurate view of the supply chain makes for poor decisions) and manufacturing innovation. As the last few ounces of efficiency are pushed out of factory floors, new innovation based on a detailed view of the entire product lifecycle offers a significant competitive advantage. Increasingly it's not a question of "if" these issues must be addressed, but "when" and "how"—and what price firms will pay for waiting. While some companies struggle to arrive at an internal "version of the truth," others are already focused on the strategic opportunities that master data creates for collaboration beyond corporate walls.

Master data management, at its core, is a combination of people, processes, and technology working together to provide an accurate depiction of an enterprise's moving parts. Without it, companies cannot harness the potential of collaborative business webs and Service Oriented Architecture. Knowing and managing with the truth means companies can compete in the networked world. Thanks to master data management, sharing that truth—or even arriving at it in the first place—is now easier and more valuable than ever.

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Endnotes

¹ Rex Martin, Chairman, President and Chief Executive Officer, NIBCO. SAP Business Forum, Customer Roundtable, October 20, 2004.

² Don Tapscott, “Knowing and Competing with the Truth: The Advent of ‘Master Data Management’ and Why it Matters to the CEO.”

³ Interview with Jong-Young Yun, CEO, Samsung Electronics. Erick Schonfeld, “The Master of Gadgets,” *Business 2.0*, November 1, 2005.

⁴ Stewart McKie, “Collaborate to Innovate,” *Intelligent Enterprise*, March 2004.

⁵ Deloitte Touche Tohmatsu, “The challenge of complexity in global manufacturing: critical trends in supply chain management,” 2003.

⁶ Product Development & Management Association, “Why Some Companies Succeed With New Products,” *Media Advisory*, April 1998.

⁷ Deloitte Touche Tohmatsu, “The challenge of complexity in global manufacturing: critical trends in supply chain management,” 2003.

⁸ All outsourcing figures sourced from: Deloitte Touche Tohmatsu, “The challenge of complexity in global manufacturing: critical trends in supply chain management,” 2003.

⁹ Interview with David Newman, Vice President, Gartner Group, conducted by Alan Majer, Bob Tapscott, and Brendan Peat, December 8, 2005.

¹⁰ Interview with Peter Storti, principal at Kalypso, conducted by Alan Majer, January 6, 2006.

¹¹ Interview with George Young, founding principal of Kalypso, conducted by Alan Majer and Bob Tapscott, January 12, 2006.

¹² Interview with Peter Storti, principal at Kalypso, conducted by Alan Majer, January 6, 2006.

¹³ Interview with George Young, founding principal of Kalypso, conducted by Alan Majer and Bob Tapscott, January 12, 2006.

¹⁴ Interview with Peter Storti, principal at Kalypso, conducted by Alan Majer, January 6, 2006.

¹⁵ Interview with Jong-Young Yun, CEO Samsung Electronics. Erick Schonfeld, “The Master of Gadgets,” *Business 2.0*, November 1, 2005.

¹⁶ Q&A with Joe DeZarn, Director of Marketing Communications, Rubbermaid Commercial Products, June 20, 2005.

¹⁷ Ibid.

¹⁸ Rex Martin, Chairman, President and Chief Executive Officer, NIBCO. SAP Business Forum, Customer Roundtable, October 20, 2004.

¹⁹ Ibid.

²⁰ SAP Customer Success Story. “NIBCO Incorporated: SAP Master Data Management is Key to NIBCO E-Commerce Leadership in the Flow Control Industry,” 2005.

²¹ Interview with Gabriele Bauman, SAP Technology Lead at Nortel, conducted by Bob Tapscott, Alan Majer, and Brendan Peat, December 13, 2005.

²² Gary S. Vasilash, “Considering Sienna: 53,000 miles in the making – On Cars,” *Automotive Design & Production*, March 2003.

²³ Interview with Peter Storti, principal at Kalypso, conducted by Alan Majer, January 6, 2006.

²⁴ Interview with George Young, founding principal of Kalypso, conducted by Alan Majer and Bob Tapscott, January 12, 2006.

²⁵ Interview with Peter Storti, principal at Kalypso, conducted by Alan Majer, January 6, 2006.

²⁶ For more detail on new master data management approaches see: Don Tapscott, “Knowing and Competing with the Truth: The Advent of ‘Master Data Management’ and Why it Matters to the CEO.”

²⁷ Interview with Peter Storti, principal at Kalypso, conducted by Alan Majer, January 6, 2006.

²⁸ Interview with Ed Toben, CIO, Colgate-Palmolive, conducted by Alan Majer, Don Tapscott, Bob Tapscott, and Brendan Peat, December 12, 2005.

²⁹ Interview with George Young, founding principal of Kalypso, conducted by Alan Majer and Bob Tapscott, January 12, 2006.

³⁰ Interview with Peter Storti, principal at Kalypso, conducted by Alan Majer, January 6, 2006.

³¹ Interview with George Young, founding principal of Kalypso, conducted by Alan Majer and Bob Tapscott, January 12, 2006.

³² Interview with Filippo Passerini, CIO, Procter & Gamble, conducted by Don Tapscott, Bob Tapscott, and Alan Majer, January 24, 2006.

³³ Interview with George Young, founding principal of Kalypso, conducted by Alan Majer and Bob Tapscott, January 12, 2006.