

## Dawn of a New Era in Operations Management Solution Delivery

By Tom Fiske

### Executive Summary

Companies, faced with rapidly changing markets and business opportunities, need real-time information exchange between business and plant floor systems. The cost and difficulty associated with integrating disparate systems remains a ubiquitous problem inhibiting the timely flow of information within an enterprise. Poor information flow presents a significant barrier to performance improvement. Developing a highly effective operations management (OM) environment requires tying together the fragmented application and solution implementations across a company's many plants, while providing a means to collaborate with the numerous systems integrators (SIs) that support those deployments.

The OM space is, and will remain, a heterogeneous environment that presents numerous integration challenges. Integration often depends on costly custom interfaces and proprietary routines. Cognizant and Invensys Operations Management have formed a partnership to develop and deploy a seamlessly integrated OM solution that is easier to maintain, offers more flexibility, and has a lower total cost of ownership (TCO) than interconnected systems.

Cognizant and Invensys have formed a strategic partnership to develop and deploy a seamlessly integrated OM solution, from sensors to enterprise systems. The two companies will collaborate, with Invensys applying its manufacturing system expertise and Cognizant applying its business system and SI expertise, to deliver an OM solution that is easier to maintain, offers more flexibility, and has a lower total cost of ownership (TCO) than interconnected systems.

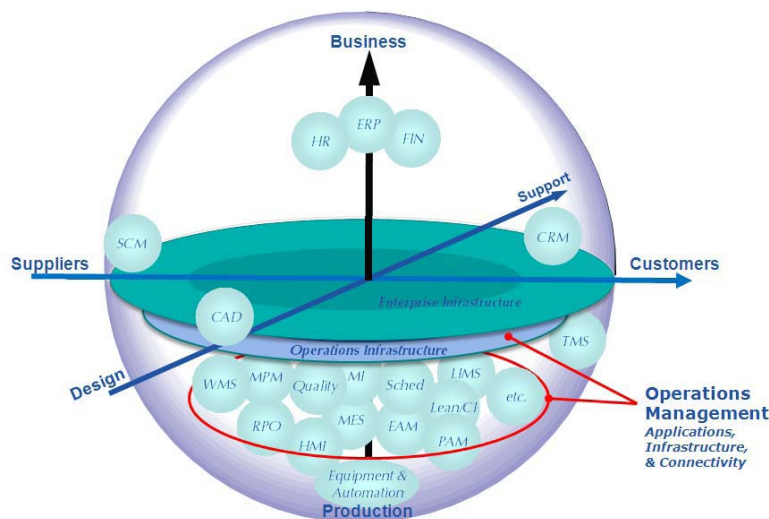
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### Operations Management Unifies Decisions and Business Processes

Nearly every manufacturing company uses a variety of plant automation and enterprise IT systems to manage its operations. Plant floor systems, such as distributed control systems (DCS), programmable logic controllers (PLCs), and a wide range of plant floor applications provide a wealth of real-time information regarding productivity, efficiency, equipment health,



capability, and quality. Business systems, in turn, provide information on raw material costs, product orders and inventories, manufacturing resources, production schedules, and so on. This wide range of information often remains in isolated systems such as manufacturing execution systems (MES), laboratory systems, maintenance systems, scheduling systems, enterprise resource planning (ERP) systems, supply chain management (SCM) systems, and customer relationship management (CRM) systems. Local decisions based on data from any one of these system will always be less than optimal because, without the corresponding information from the other systems, the information will be incomplete.



**Collaborative Management Model**

At a time when companies need to better understand, control, and improve their manufacturing capabilities, most have difficulty answering the most basic questions. How are manufacturing operations currently performing against targets? Does the company have the resources and capacity to take advantage of new opportunities? Can the company deliver on-spec product to the customer, on time? Finding the best answers to questions like these requires, at a

minimum, an OM solution that synchronizes information contained in the systems and applications distributed throughout an organization.

In ARC's Collaborative Management Model, OM encompasses managing the people, business processes, technology, and assets involved in:

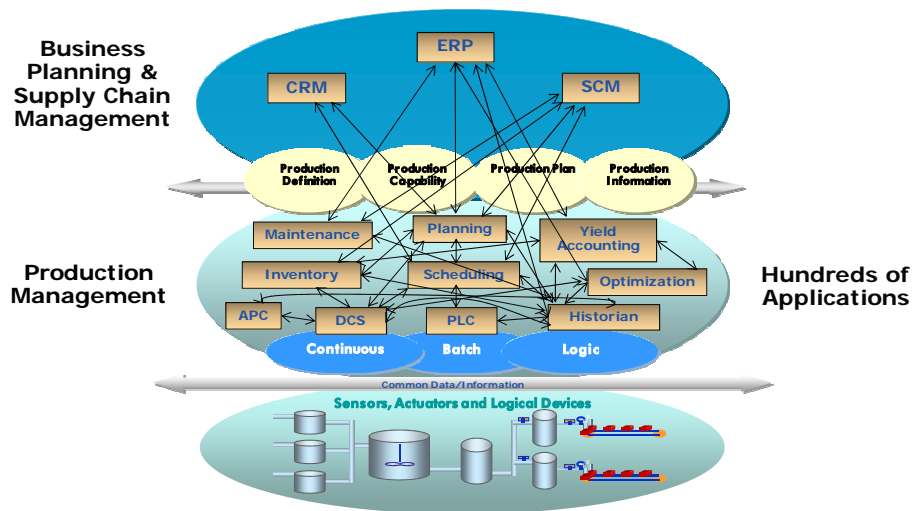
- procuring, receiving, and managing raw materials
- implementing product designs, specifications, formulations, and recipes to manufacture products
- complying with regulatory requirements; and
- distributing these products to customers

## Business Variables and Transactions Are Becoming Real Time

Nearly all manufacturers excel at producing products when there is little change or variability in market demand, raw materials, or energy costs. Unfortunately, feedstock and energy costs fluctuate on an hourly basis and variable demand drives companies to constantly seek new opportunities. Most manufacturers don't respond well under these conditions. One reason is that business systems, which tend to be transactional in nature, typically have little influence on real-time plant floor activities. Another reason is that as the speed of business inputs and transactions become more real time, manufacturers require more flexible allocation of assets to meet customer demand and remain profitable. Increasingly, manufacturers need to make decisions regarding price, availability, plant capacity and capability, and deliveries in real time.

## Performance Gaps

Faced with rapidly changing markets and business opportunities, companies need real-time information exchange between business and plant floor systems. The cost and difficulty associated with integrating disparate systems remains a ubiquitous problem inhibiting the timely flow of information within an enterprise. In many facilities, plant floor control and production management systems still do not communicate directly with business systems dedicated to accounting, forecasting, and other resource planning activities. As a result, business systems are unaware of important



## Increasing Complexity and Disparate Applications Hinder Manufacturing Excellence

manufacturing details such as the availability of equipment, materials, maintenance schedules, records of past process performance, product quality, or the status of work in progress. Poor information flow presents a significant barrier to performance improvement.

Most companies have accumulated or inherited numerous point solutions over time. In addition, a typical plant may have over 200 applications, far too many for one suppli-

er to provide. The OM space is, and will remain, a heterogeneous environment that presents numerous integration challenges. Integration often depends on costly custom interfaces and proprietary routines. The use of standard technology, architecture, approaches, and solutions for integrating applications significantly reduces costs and improves overall enterprise performance.

In the global environment, manufacturers feel the pressure to improve real-time performance across their organizations. In a heterogeneous environment, there is a clear need for an easier, cost-effective means for manufacturers to connect applications residing on both business and plant systems to enable interoperability. Doing so across complex or distributed operations, which are at the heart of OM, requires a higher level of integration and interoperability than currently achievable. Developing a highly effective OM environment requires tying together the fragmented application and solution implementations across a company's many plants, along with providing a means to collaborate with the numerous SIs that support those deployments.

### **Sustainability Requires Operations Management**

With growing concerns about global warming and other environmental damage, companies are beginning to adopt sustainability programs. To many, sustainability has come to mean "green" or "environmentally friendly." However, sustainability has a much broader and far-reaching meaning. Sustainability is a business model that encompasses the premise of being able to operate indefinitely while delivering economic benefits and being socially and environmentally responsible.

Most energy-intensive operations, such as a refinery or chemical plant, experience considerable variability in energy consumption due to changing operating conditions, equipment degradation, fluctuating market conditions, and inefficient control strategies. This results in plants using more energy than necessary. Even worse, these plants are unable to improve energy efficiency because they lack the means to collect and analyze real-time performance information in real time. Instead, they only have access to historical performance data and cannot take corrective action until it is too late.

End users need real-time solutions, like OM, that can tell them when energy consumption is moving in the wrong direction, for example, or is already

too high. Intelligent OM solutions also provide much-needed advice to personnel on how to bring the plant back to optimal energy usage.

For most companies, sustainability programs make sense for a number of reasons that go beyond the obvious environmental benefits. Sustainability helps companies to better deal with escalating raw material and energy costs. It helps them reduce waste, comply with environmental regulations, and maintain a positive public profile.

### **Partnership to Deliver OM Solutions**

Cognizant and Invensys have formed a strategic partnership to develop and deploy a seamlessly integrated OM solution, from sensors to enterprise systems. The objective is to help companies achieve enterprise-wide optimization. The two companies will collaborate, with Invensys applying its manufacturing system expertise and Cognizant applying its business system and SI expertise, to deliver an OM solution that is easier to maintain, offers more flexibility, and has a lower TCO than interconnected systems.

Under Cognizant's leadership, Invensys' Hyderabad development organization will conduct the bulk of the software development and support for Invensys Operations Management. Invensys will be responsible for system architecture, product planning, and management. Invensys will use Cognizant's resources, platforms, and tools, including its global knowledge management and program management platform, Cognizant 2.0, to streamline its software development and maintenance processes.

### **Invensys Operations Management**

Invensys Operations Management (IOM) division was formed by bringing together Invensys Process Systems, Wonderware, and Eurotherm to help clients leverage the real-time convergence of manufacturing infrastructure and business operations. IOM operates as a unified business with an extensive portfolio of consulting, service, and product offerings targeting the oil and gas, chemicals, power generation, pulp and paper, and metals and mining industries. IOM's solutions address elements of operations from the plant level -- measurements, control, safety, and optimization -- through to complete production management and OM solutions at the business level.

One of the key underlying enablers for IOM's solution approach is Invensys' ArcestrA technology, which incorporates Microsoft .NET and server

technologies as an industrial services-oriented architecture (SOA) to extend, unify, and integrate existing automation systems, information systems, or applications. ArcestrA technology also provides a unifying architecture that makes it easier to capture and reuse domain knowledge across process, hybrid, and discrete manufacturing segments.

ArcestrA industrial SOA technology also provides the underlying technology elements for IOM's InFusion solution that delivers Enterprise Control System (ECS) capability. The InFusion ECS provides an enterprise view of manufacturing operations based on a common architecture for integrating plant-level systems and applications with business-level systems and applications. InFusion provides a common architecture that allows users to drive down the cost of integrating the many disparate automation and production management systems that exist in today's plants.

### **Cognizant's Capabilities**

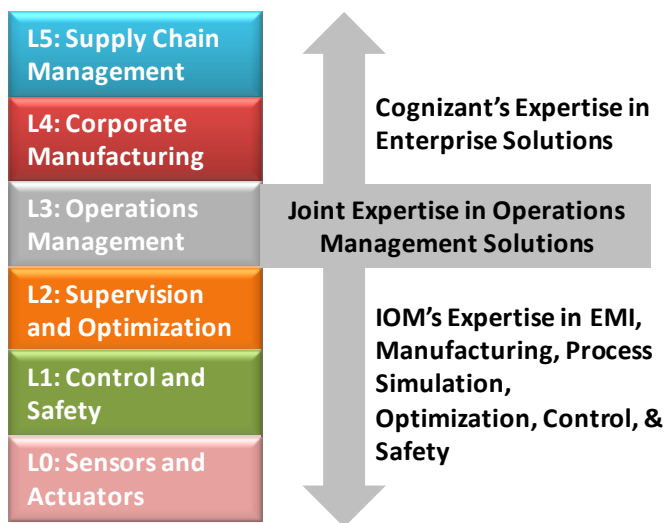
Cognizant is a leading provider of IT, consulting, and business process outsourcing services. Cognizant's breadth of services ranges from conceptualization through implementation, support, and enhancement to meet evolving business needs

Cognizant has the unique ability to address many of the performance shortcomings of traditional manufacturing and enterprise systems. Cognizant is a vertically focused solution provider with significant experience and domain expertise that spans the complete business process of implementing enterprise systems tightly integrated with the plant floor layer and subsequently covering the plant systems. The company has numerous clients in the industrial and automotive markets as well in the consumer products, energy and utilities, and the pharmaceutical manufacturing sectors. Its services include business process consulting; IT strategy consulting; enterprise resource planning (ERP) system implementation and maintenance; data warehousing and business intelligence; and application testing, application maintenance, and infrastructure management.

### **Cognizant and IOM's Approach to Unified Operations Management**

As the extended enterprise becomes a reality, organizations need common ways to solve business problems across all their operating assets. The ability to standardize systems within the framework of their IT infrastructure is

a key motivating factor for adopting standard OM applications throughout the enterprise. As a world-class SI, Cognizant can support the growing needs of its global customers to standardize applications and implement best practices across their enterprises. As companies adopt standard technology across their enterprises, they also look to reduce the number of costly one-off solutions while leveraging the existing IT Infrastructure to reduce TCO. Invensys and Cognizant now jointly address the end-to-end business processes from Level 1 to Level 5 in the traditional manufacturing hierarchy.



#### Seamless OM Solutions across the Enterprise

Cognizant continually innovates, bringing the latest technology and solutions to its customers. To augment its innovation and solution capability, the company has numerous research, technology, and strategic partnerships with organizations including Carnegie Mellon University, Microsoft, SAP, and IOM. In addition, Cognizant provides long-term sustenance support services for the installed base.

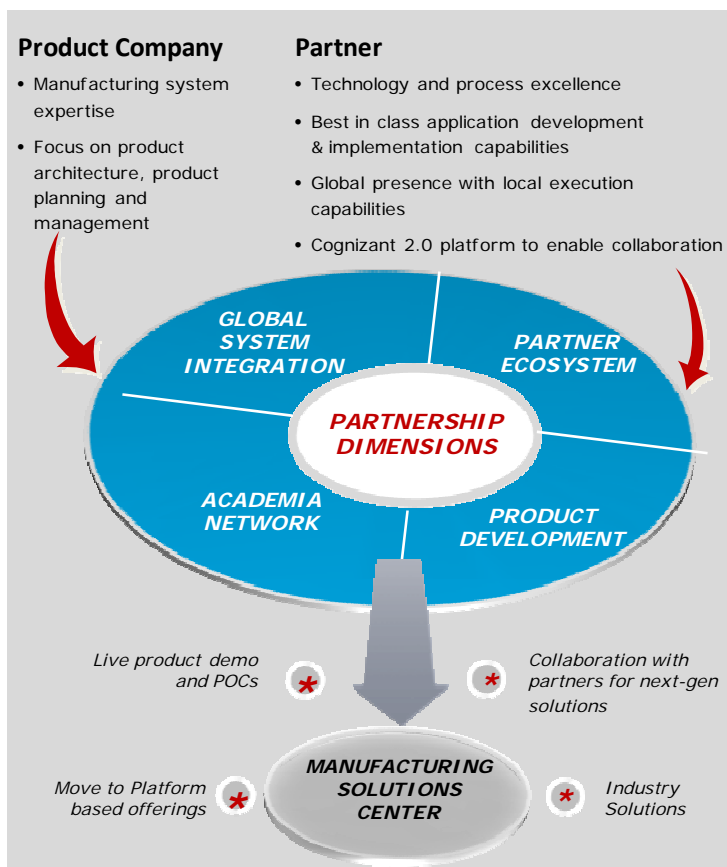
Manufacturers with geographically dispersed operations increasingly rely on global SI partners in their journey

toward the integrated manufacturing enterprise. Global SIs, such as Cognizant, fill the critical need for a partner with domain knowledge, multi-technology skills, proven project management expertise, and global presence with local execution capabilities. Having such a partner ensures that the business benefits of a manufacturing systems strategy are realized through a globally valid design and architecture. This enables quick and consistent OM solution deployment wherever the operations are located. In this process, Cognizant works collaboratively with the niche systems houses that may be co-located with the operating sites of the manufacturers and cater to the core automation and related systems needs. Cognizant has proven its innovative capabilities by managing and executing large-scale global programs.

Cognizant recently launched its Cognizant 2.0 platform. This is a combination knowledge management/project workflow tool that incorporates Web

2.0 technology to leverage the combined intelligence and skills across Cognizant's entire 60,000-plus workforce. The platform enables Cognizant's numerous global, regional, and local development centers -- along with other local and regional SIs -- to collaborate effectively through one central platform and deliver significant time-to-market, cost, and transformational value to clients. Cognizant's customers also use the 2.0 platform to integrate their disparate global SI efforts too.

Together, Cognizant and IOM will provide an OM solution for the process industries. The partnership's ability to offer vertically focused solutions is important, as each sector has its own unique set of requirements and business processes. The strategy is to tailor a specific solution, while leveraging standard components and applications to the greatest possible extent to simplify implementation and reduce TCO. Cognizant can also play the central role of a global SI that can work with local implementation houses where required. Key elements of Cognizant's strategy are:



**Cognizant's Approach to Product Development, Solution Implementation, and Productization**

- Build vertical solutions leveraging the domain capabilities, core technological strengths, and knowledge of the full range of IOM instrument, system, and software products to build industry-specific functionalities on the IOM platform.
- Use Manufacturing Solution Center (a platform for conceptualizing and development of industry templates for shop floor-to-top-floor solutions) to help the customer's experience.
- Leverage the academic and technology partner eco-system to drive innovation and deliver business benefits to customers.

- Deploy collaborative project execution and knowledge management approaches for solution delivery.

The partnership will benefit all parties concerned, especially the users who can expect a fully integrated OM solution with significantly advanced functionality. The partnership will take advantage of Cognizant's significant domain expertise in software development and experience in ERP system integration, data warehousing, business intelligence, and SOA-based architecture to enhance the overall OM development and implementation effort. This will enhance Invensys' next generation of OM products, such as InFu-sion, and provide a much wider enterprise perspective.

## Conclusion

To date, the major issue with business systems is that they don't provide real-time performance measures to support fast operational decision-making. On the other hand, automation systems are designed to measure real-time process variables and control the process to specific targets, but lack business context for real-time performance analysis. Effectively managing real-time manufacturing operations requires aggregated and contextualized information from a variety of data sources. This information must be culled, filtered, and presented in a role-based form that is easy to interpret and use.

In an effective OM environment, there should be no barriers to collaboration or information access. The goal is a single environment with common data, common presentation, common time, and unified work processes. Today's business environment requires real-time information. The focus is on flexibility, efficiency, capability, and opportunity, transcending manufacturing to include the entire enterprise and even the supply chain. Manufacturing is now required to make Capable-to-Promise and Profitable-to-Promise commitments in real time.

Invensys' production management and operations applications represent key components in operations management, but alone, do not have the required scope for many manufacturers. A holistic enterprise perspective is needed. This requires an OM solution that supports and integrates plant and business work processes along with the necessary plant applications and business systems, including ERP, SCM, CRM, EH&S, and PLM. Bringing this all together requires exemplary high-level systems integration

skills. Cognizant has the ability, experience, and domain expertise to develop, provide, and implement key supporting technologies necessary to deliver an effective OM solution.

An integrated solution approach, as opposed to interconnections of various applications (product approach), provides a more reliable, robust, and flexible OM environment that costs less to implement and maintain. It does, however, require a wide range of heterogeneous products and technologies. This, in turn, requires the expertise of partners with knowledge of both automation and enterprise systems. It also requires an experienced global SI to bring it all together and to support a global manufacturer.

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