A BLUEPRINT FOR THE REAL-TIME ENTERPRISE

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WHAT’S INSIDE:
1. Background
2. Critical Real-Time Business Variables
3. Operational Business Management
4. Conclusion
**BACKGROUND**

Manufacturing and production processes have had to be controlled and managed in real-time from inception because they change in real timeframes. This has been a natural premise of industrial systems from the very beginning.

A major shift in the business of manufacturing has occurred over the past decade, which is driving the dynamics of the business of production and manufacturing into real-time domain. Business variables, such as energy prices, feedstock prices and even product prices have rapidly transitioned from highly transactional timeframes into real timeframes. For example, a decade ago it was not unusual for an industrial plant to establish a contract with its energy supplier that essentially set the price over an extended time period, often six months to a year. Today, in most parts of the world, long term fixed price energy contracts are not being offered and the price of energy can change many times in a day. The implications of this transition are clear. Industrial business functions must operate in real-time to be effective and efficient. Industrial companies that do not move to real-time business operations are at a severe disadvantage in their marketplace.

**CRITICAL REAL-TIME BUSINESS VARIABLES**

Manufacturing and production facilities exist to produce products that have value and sold in a targeted marketplace. Therefore, the primary business measure of any manufacturing facility is the production value that the facility can generate. Notice that business value is not the same as throughput as the objective is not the volume of product but the economic value the company receives as a result of making the product. This may seem obvious, but the tradition in many manufacturing segments has been to manage production volume rather than production capacity. In a real-time business world maximizing these two variables is accomplished very differently.

The secondary business variables associated with manufacturing operations deal with the cost of operation. Costs typically partition into fixed and variable costs. Variable costs tend to be the costs that are impacted mainly through the effective operation of the processes. In most production operations, energy costs and material (feedstock) costs comprise most of the variable cost of operation. Both of these costs are verging on real-time variability in many segments, making them the primary target for real-time business improvement.

Finally, improvements in production value, energy costs, and material costs are often constrained by safety and environmental considerations. Therefore, safety and environmental stewardship must be considered among the variables affecting the performance of any industrial operation. The model to the right displays these five primary business variables in relationship to each other.
These five business measures represent the primary measures of the business performance of an industrial operation, and are becoming real-time variables with respect to variability. Traditional business management approaches that address these variables on a monthly, weekly, or even daily basis are inadequate in a real-time environment. The business of industrial enterprises is verging on real-time and requires real-time management and control strategies to maximize performance.

**OPERATIONAL BUSINESS MANAGEMENT**

Traditional approaches to the effective management of industrial complexes have been described under the label of "operations management," but in today's real-time business environment, operations management provides only a part of the solution. The challenge is to couple the management of the operation with the drivers of the business. This requires a new strategy that crosses the operational and business boundaries and provides a more holistic approach to managing and controlling the operation for business success. This new strategy is called Operations Business Management and the four basic components of an operations business management strategy are displayed below.

The first aspect of an Operations Business Management strategy is the measurement of the operation in business as well as operational context. Traditional operational measures, key performance indicators (KPIs), have been determined on a daily or longer basis for most manufacturing facilities, and business measures on a monthly basis. Neither time frame is adequate to the challenge of a real-time business environment. The real-time business measurement system required to underpin Operations Business Measurement incorporates both real-time KPIs and real-time accounting measures (RTA) to provide a comprehensive view of the value of the operation.

The second component of an Operational Business Management system is Real-Time Empowerment. Each person within the operation may perform activities that add or reduce the business value produced by the operation. Unfortunately, in most cases people have no idea whether what they are doing is adding or subtracting value because they have no view into value generation. The real-time business empowerment function provides each person within the operation with the correct information...
required to determine what value they are generating for the company. This is accomplished by combining the real-time KPIs, RTA measures, and prioritizing the combined set of measures to the manufacturing strategy and the responsibilities of each person. This is done by applying a strategic filter to the combined measures and the strategic filter prioritizes the measures. These prioritized measures are provided to the employees who influence the performance of the operation via real-time dashboards or scorecards. A hierarchy of dashboards and scorecards is developed from the plant floor to the executive levels of the company to ensure that, not only is each person empowered to perform their activities more effectively, but that all levels within the organization are aligned to a single mission – maximizing the business value from the operation.

The third key component is Real-Time Business Control. The concept of direct process control has become so well accepted at the plant floor as to be almost second nature. Unfortunately, direct process control technologies are only applied to lower-level process variables, and where these technologies are applied, they perform admirably. One limiting factor for the application of control technologies is that the variable to be controlled must be measured in real-time. Now that business variables are measured in real-time, direct control of business variables is finally viable. Industrial companies can finally move beyond trying to manage the business effectively to controlling key business variables.

The fourth key component of Operations Business Management is Real-Time Business Optimization. Once key business variables are under direct control, a new opportunity arises in industrial operations, the opportunity to optimize the value of key business measures across the operation by fostering the development of a cooperative organization. Traditionally, industrial organizations have been highly disjointed due to the separation of experience and expertise, resulting in organizational silos that do not work well together to meet the business objectives. For example, in most plants the maintenance team and the production team run as independent activities with little or no cooperation. These two teams are responsible for the effective and efficient operation of the same industrial assets used to produce products. The opportunities for business improvements that can be realized through cooperation of these groups are enormous, and this does not stop with operations and maintenance. The automations technology and information technology teams, the engineering and accounting teams, along with other similar silos in industrial organizations do not cooperate to the degree necessary to optimize the business. Technology does not solve this problem by itself, but a plant management team that understands the value of collaboration across the organization can be supported by an effective technology infrastructure. This will move the business toward an optimal business operation. As the great management scientist Peter Drucker pointed out, “knowledge based innovations...are almost never based on one factor, but on a convergence of several kinds of knowledge.” The convergence of several kinds of knowledge leading to innovation and performance improvements in industrial organizations occurs when organizational silos are effectively bridged. This is the primary basis of Real-Time Business Optimization.

The four basic components of an Operations Business Management system combine to provide the real-time information and functionality required to underpin an effective Real-Time Enterprise approach. The Operational Business Management system fits very nicely under some of the more transactional aspects required to effectively manage an operation as displayed in the figure below. The Operations Business Management system can make the transactional functions operate more effectively by providing real-time business information and effectively implementing the outputs of those functions as they influence the manufacturing and production operations.
CONCLUSION

The business of manufacturing and production is rapidly becoming a real-time business. Effectively managing and controlling such a business requires a system that can measure real-time business changes and respond to the changes in real-time. Traditional business management approaches fall far short of this. Industrial businesses must transition to Real-Time Enterprises. This may seem like an allusive ideal, but it is not. The move to a Real-Time Enterprise can be made today by expanding the domain of real-time automation and implementing an Operations Business Management system, which provides the information and functionality to drive the Real-Time Enterprise.

There are no more excuses, the time is now and the industrial companies that capitalize on this transformational opportunity will be the leaders of the emerging generation.

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