Operations Excellence

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1. Introduction

Invensys Operations Management division of Invensys was formed in May 2009 by combining Invensys Process Systems — Avantis®, Foxboro®, InFusion™, SimSci-Esscor™ and Triconex® — with Wonderware®, Eurotherm® and IMServ®. The basis for this move was each of these four traditionally separate and excellent business units would provide more value for clients working together to solve difficult business problems that could not be solved by each unit separately. The Invensys leadership believes that the combined business would help to define and develop leadership in an emerging market space referred to as Operations Management. Invensys Operations Management will focus all of its resources to help customers drive Operations Excellence into their businesses.

Attaining Operations Excellence requires that industrial companies maximize the efficiency and profitability from their operations through excellent control, drive maximum business value from all their industrial assets, continually drive and increase productivity from all operations-focused personnel, all while reducing negative environmental impact and improving safety. Therefore, Invensys has defined Operations Excellence along four key themes: Control Excellence, Asset Excellence, Productivity Excellence and Environment and Safety Excellence (Figure 1).

![Operations Excellence Component Model](image)

Figure 1: Operations Excellence Four Key Themes

These four critical components of Operations Excellence provide the scope and maturity model for attaining Operations Excellence. They frame the scope by bringing to light the various aspects of focus that must be considered when striving for Operations Excellence. They also explain the maturity model as most industrial companies progress toward Real-Time Operations Excellence by starting with Control Excellence, moving to Asset Excellence, empowering their talent to drive Productivity Excellence and moving toward a holistic approach by balancing the profitability improvements possible through effective implementation of the first three excellence areas with the business constraints imposed by Environment and Safety Excellence. Although every company approaches all four areas simultaneously, to some degree, the formalization of a structured Operations Excellence approach often matures through these four stages.

The definition of Real-Time Operations Excellence is best expressed by focusing on both the ongoing aspects as well as the desired outcomes. The definition of Real-Time Operations Excellence is continuously improving profitability from industrial operations in real time. It should be noted that the focus could be a single asset, an industrial plant, or an entire industrial enterprise.

2. Control Excellence

The entire science of industrial automation began with the measurement and control of manufacturing processes. In many respects, The Foxboro Company and Eurotherm had been leading innovators and playing a major role in defining the science of process measurement and control. Throughout the past decades, the science of control has advanced considerably, enabling unsurpassed levels of operational efficiency in manufacturing processes. Operational efficiency essentially equates to maximizing the throughput of
the operation while simultaneously minimizing energy and material consumption. Although the technology of control allows for high levels of process efficiency, the downsizing of engineering organizations in most industrial companies over the past decade has caused an under utilization and reduced effectiveness of control technologies in many plants.

Traditionally, the key business variables of industrial operations have been stable over extended time periods. For example, energy contracts could be developed with power suppliers over a 6 month or annual period that essentially relegated the price a plant was paying for energy to a constant over the contract duration. With constant business variables, controlling the efficiency was tantamount to controlling the economics of plant. This situation has changed drastically over the past few years. With the opening of the power grids throughout the world, long-term energy contracts were no longer viable and the price of energy to many industrial plants started to change multiple times in a single day. This had a domino effect to the other critical business variables of industrial operations; production value and material costs. Today the market also demands that many industrial operations produce a greater variety of end products differing in specification, grade, or flavor. Pressure to produce to rapidly changing market demand means operations must increase their agility in making frequent production changes.

With this shift toward real-time variability of the critical business variables of industrial operations, although the efficiency of plants may have been under control, the business of the industrial companies became out of control. Many industrial management teams were at a loss as to how to deal with this situation, but to control engineers it became clear that this was just another higher-level control problem that could be effectively addressed through the application of process control technologies and techniques to business metrics.

Invensys Operations Management has established an industry leading position in the application of real-time control technologies to the key business variables of industrial operations. Not only does Invensys hold patents on real-time business measurement, but they also have patents pending on real-time business control. Invensys can bring its expertise together to control both the efficiency and business of industrial operations and enterprises. Experience has demonstrated that business profit control effectively cascades to process efficiency control to maximize both efficiency and profitability of industrial plants (Figure 2).

**Figure 2: Business Profit Control Cascaded to Process Efficiency Control**

To summarize, control excellence is attained when both the business of operations and its production processes are brought under control to optimize operational efficiency and business profitability.
3. Asset Excellence

Industrial companies are asset intensive operations and maximizing the profitability of these operations is a direct function of how effective they are at managing the return on assets. Here, Avantis® has played a major role with the Computerized Maintenance Management Software and services, going beyond traditional asset management to provide the relevant asset intelligence you need. Unfortunately, in many industrial operations the phrase “asset management” has become the equivalent of maintenance management. That is, most operations view asset excellence as being excellent at maintaining their assets. Although maintenance is a necessary component of an effective Asset Excellence strategy, good maintenance practices, by themselves are insufficient. The effectiveness of any complex asset is both a function of how the asset is maintained and how it is operated. For example, with an automobile, if the mechanic works hard to keep it maintained, but the operator drives it aggressively in off road environments, the overall effectiveness of the asset will decline rapidly. Therefore, at Invensys we define Asset Excellence to be balancing effective utilization and availability of all assets for maximum enterprise profitability (Figure 3). Effective availability and effective utilization of most assets tend to be inverse functions and the maximum profitability produced by the asset over time can be derived by the correct balance of effective availability and utilization.

The journey to the highest levels of profitability needs to cover all assets across industrial enterprises, and recognize that dynamically balancing a set of related assets can yield greater results. An exhaustive categorization of assets includes not only physical assets, but human assets, financial assets, knowledge assets, and intangible assets. Every industrial asset should produce positive business value, or be replaced.

![Asset Excellence](image)

**Figure 3: Asset Excellence**

Balancing Effective Availability and Utilization

Invensys Operations Management is in the process of establishing itself as a leader in providing Asset Excellence across the most profit impacting assets in Industrial enterprises. Invensys has continually been recognized for its strength in optimizing the operations of processing equipment through control, simulation, modeling and optimization technologies. Combined with newer capabilities through condition monitoring and management, as well as performance analysis on production machinery such as motors, fans, pumps, actuators, and sensors, Invensys Operations Management helps its customers transition to a unique proactive Asset Excellence approach designed to provide the balance that will maximize profitability from all physical assets.

Additionally, Invensys’s leadership in technology for human asset management and human performance management based on performance visibility, on line training, virtual reality-based training and its patented real-time performance measurement, provides among the best industrial operations human performance improvement approach available in today’s industry.

Driving to Asset Excellence is critical to the business success of industrial companies and Invensys Operations Management is uniquely positioned as the partner for Asset Excellence success.
4. Productivity Excellence

Productivity can be defined in many ways, but is usually associated with the output of a production process per unit of input, and in recent years, it has become most associated with output from an industrial enterprise per production worker. Wonderware software, known for HMI, SCADA and MES functions, as well as Foxboro Measurements & Instruments and open automaton systems, along with Eurotherm instruments, and SimSci-Esscor advanced control and optimization software – have all played key roles in solutions that provide productivity for industrial operations. Traditionally, production workers were often considered the laborers in industrial companies, but in today’s technology-driven world a broader view of productivity that includes all personnel that directly impact the operating profitability of an industrial enterprise could be very useful. With this expanded definition in mind, Productivity Excellence involves empowering all personnel involved in production operations from the CEO right down to the frontline operations and maintenance staffs with the information and capability required to maximize production value for increased profitability.

Traditional notions from the industrial revolution that relegate frontline personnel as the labor force of industrial operations are starting to give way to the idea that every person in the operation that has direct impact on the performance of a manufacturing or production process should be viewed as a performance manager. Every person in industrial organizations impacting operational performance must be empowered with the contextualized information to understand how their actions impact production performance and the tools to drive positive outcomes from their actions. The scope of a Productivity Excellence strategy involves operations, maintenance, quality management, engineering, supervision, material management, plant management, production management and corporate management personnel. If each of these performance managers drives maximum profitability from their domain of responsibility, the result will be maximum overall enterprise profitability.

Once again, Invensys Operations Management has been a pioneer in the development and execution of Productivity Excellence strategies and is the ideal partner to help industrial companies toward Productivity Excellence. Invensys has a proven track record as a leader in real-time business intelligence, HMI, enterprise visualization, remote visualization, mobile solutions, engineering tools, simulation and operations team training, real-time business measurement, real-time business management and control. This combination provides the basis for Productivity Excellence. However, Invensys Operations Management also provides Business Value Consulting, where our experts work closely with clients to utilize improved processes and advanced technologies according to the exact needs of any industrial operation – to maximize the effectiveness of a Productivity Excellence strategy and to drive incremental profitability from industrial enterprises.

5. Environment & Safety Excellence

Although managing efficient and profitable manufacturing and production operations is a top priority of industrial companies, doing so in a safe and environmentally responsible manner continues to be very important and the emphasis on Environment & Safety Excellence is ever increasing for industrial operations. Safety and environmental concerns are often constraints on profitability of the enterprise. The dynamics around safety and environmental issues are highly variable with the operations and maintenance of an industrial plant and must be managed in real time. Invensys believes that the technology available today combined with decades of experience at managing the efficiency of industrial plants within the constraints of environment and safety, enables a unique solution approach to real-time balancing of profitability with the environmental and safety constraints for ongoing maximum profitability. Therefore, the definition of Environment & Safety Excellence is best expressed as a balancing of social responsibility, safety, world-class environmental sustainability and long-term profitability of industrial organizations.

Too many environmental and safety initiatives have been driven into the marketplace that are positioned to be independent of the profitability of the organization. This relegates environmental and safety initiatives to a necessary evil. True Environment & Safety Excellence requires that the business objectives be integrally and holistically linked with environmental and safety needs in an ongoing manner as the plants operate.

Environment & Safety Excellence strategies touch on almost all aspects of an industrial operation including reducing overall operating costs, reducing waste, lowering energy consumption, decreasing harmful environmental emissions, increasing productivity, reducing negative impact on the environment, eliminating incidents (both safety and environmental), improving cyber security and security validation, and building automation management. This demonstrates the pervasive nature of environment and safety in industrial operations today. Currently, the main focus areas for industrial companies are emissions management (specific to carbon footprint),
energy management (often focused on consumption), and water management because of the focus of government regulation. It is clear that with social responsibility concerns and the expansion of government focus on environment and safety issues, a more holistic environment and safety strategy is typically appropriate.

Invensys Operations Management is poised to take a strong leadership position in Environment & Safety Excellence by bringing together the wide range of technology and expertise from across the merged companies in order to significantly impact the Environment and Safety areas of our customer’s businesses. Invensys Operations Management is the global leader in safety shutdown and safety instrumented systems (Triconex), offers world leading energy management solutions and has been involved with energy management for over 100 years. Invensys also offers solutions for waste reduction, pipeline leak detection, water management, chemical recovery, combustion management, carbon tracking (IMServ), cyber security and building automation management (Eurotherm and Wonderware). Invensys Operations Management Business Value Consulting capability can help customers to improve productivity while reducing energy cost and material cost, while managing environmental and safety concerns.

Invensys has established a very positive reputation in the Environmental, Health & Safety (EH&S) community with its internal sustainability approach and program. Invensys has exceeded every one of its five Environmental KPI targets (CO₂, Energy, Water, Non Hazardous Waste and Hazardous Waste) and is the only company in our peer group to have been recognized and listed by the Dow Jones Sustainability Indexes, the Carbon Disclosure Project, the FTSE4Good, The Global Compact and the Carbon Trust as a leader in sustainability in 2008-2009. Invensys Operations Management realized a 13% reduction in CO₂ emissions, a 22% reduction in total waste generation, a 24% reduction in hazardous waste generation, a 25% reduction in water use, a 12% reduction in energy use, and a 45% reduction in total recordable case incident rate. Invensys also uses its own software for sustainability in its factories. Invensys’ internal record demonstrates that we practice what we preach in environment and safety and are the ideal partner to help industrial companies develop and execute Environment & Safety Excellence strategies.

6. Summary

Traditionally, industrial companies have primarily utilized automation and information technologies and talent to drive operations efficiency. Maximizing efficiency is just not good enough anymore, industrial companies must drive more than mere efficiency improvements; they must also drive profitability improvements. Continuously improving the profitability from industrial operation is how industrial companies transition to Operations Excellence.

Transitioning to a strategy of Operations Excellence has become especially urgent over the last three to five years as the business variables of industrial companies have transitioned from highly stable over extended periods of time to business variables with much real-time variability. Traditional automation systems designed to control plant efficiency were predicated on highly stable business variables. With the emergence of real-time business variability, these systems are not up to the task and many industrial businesses are finding themselves to be out of control.

Invensys Operations Management has pioneered a new approach that builds on excellence in efficiency to deal with this emerging volatile business environment. Invensys’ holistic Operations Excellence approach can be applied to drive increased levels of control at both the plant and business levels in order to improve enterprise profitability; while simultaneously driving increased profitability from all industrial assets; and while driving continuous productivity improvements from all personnel that have direct performance impact on the industrial operation. All of this can be accomplished while simultaneously managing the environmental impact and safety of the operation.

The bottom line is clear. Industrial companies must drive improved profitability from their operations while reducing negative environmental impact and increasing safety. All critical measures of operations management systems are changing in real time and presenting a daunting challenge. Invensys Operations Management’s holistic approach to ‘Operations Excellence is what is required for customers to rise to today’s real-time challenges. Invensys is working collaboratively with customers and partners to lead the market with this unique approach to Operations Excellence.