OPERATIONAL EXCELLENCE
OPERATIONAL EXCELLENCE

Journey to Creating Sustainable Value

JOHN S. MITCHELL

WILEY
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BIOGRAPHY OF JOHN S. MITCHELL

During a professional career of over 40 years, John Mitchell has held a wide range of executive, managerial, and technical positions in industry. He has been a strong and visible advocate for the development and implementation of business, technical, and operating strategies for Operational Excellence, Physical Asset Management, and Reliability and Maintenance (R&M) excellence. During his career, he has delivered numerous presentations and workshops throughout the world, stressing the necessity and financial and business benefits of optimizing work processes and technology in his areas of expertise. In semiretirement, he provides mentoring and coaching for organizations committed to improving operational productivity and effectiveness.


He is a graduate of the U.S. Naval Academy, Annapolis Maryland.
This book is addressed to three constituencies:

*Executives and senior management*: the text provides a solid definition of the concept and principles of Operational Excellence, the business/mission benefits and the value it will produce, and the importance leading enterprises have placed on its successful implementation. This information is contained in the first five chapters along with principles, requirements, basics of implementation, and commitment necessary for success. Consider the five chapters as an overly long executive summary of the details that follow.

*Leaders and third parties chartered to lead, manage, and facilitate an Operational Excellence initiative*: specific information detailing the establishment and effective implementation of the program. An Operational Excellence program produces results meeting all expectations and, of course, makes them look good in the process.

*People within an enterprise participating in Operational Excellence*: this group will find definitive principles and a detailed implementing roadmap to assure all are on the same page, working effectively to common objectives. Expectations, requirements, and mutual responsibilities are fully identified and aligned to assure maximum success.

**EVOLUTION OF OPERATIONAL EXCELLENCE**

The concepts and details that follow have been developed and refined over more than a decade of workshops and interactions with enterprises and people directly involved
in seeking maximum effectiveness and return from their efforts. This text will provide guidance and great value for executives, management, leaders, and implementers of Operational Excellence.

The path to this book began in the early 1990s. The author and a good friend, both with land-based production operations and marine experience, were attempting to discern why industrial plant maintenance, rather than the essential, profit-making part of the business that it could and must be, was typically considered a necessary evil and cost to be controlled. In many operating enterprises, maintenance was primarily directed to restoring failures reactively rather than proactive avoidance, elimination, and improvement. Furthermore, many advances in technology and practice proven to improve performance and value gained from physical production assets were not viewed in the same light as investments for improving energy and process efficiency. While the latter was presumed to generate a business return, the former was most often thought of as rather costly luxuries to be considered only when times were good. Equally important, why did performance-limiting friction exist at the working level between the operations and maintenance functions in most industrial operating enterprises?

In many operating enterprises, operations typically felt that production/mission compliance was first, foremost, and above all. Operations typically considered maintenance a service supplier: someone to call when bad things happened. This perspective and its corollary “keep the customer happy” were shared by many in maintenance. Although typical within many operating enterprises, the “keep the customer happy” premise is particularly unproductive when considering what obligations a customer, operations in this case, has to a supplier. What obligations do you have to the supplier of the tires on your automobile? Operations would say that maintenance was often unrealistic, requesting a premature halt to production to correct what operations considered minor problems or to conduct preventive tasks operations considered of secondary importance to production output. Maintenance typically replied that production too often operated equipment carelessly, didn’t really care for or about equipment until something went wrong, and then applied extreme pressure to restore operation as quickly as possible.

In the marine industry, operators and maintainers are one and the same—these tensions didn’t exist. Even if it did, open ocean swimming in creature-filled waters isn’t an attractive alternate in the event of a major failure!

A concept called profit-centered maintenance was the initial outcome of the discussions. Profit-centered maintenance advocated adopting a value, investment, return, and continuous improvement mentality, rather than the less-effective cost control to budget where there are actually disincentives for improvement.

A leading operating company had adopted a team-based profit-centered mentality within a budgetary system. It appeared to work very well, with numerous operating and business benefits. Many who reviewed profit-centered maintenance thought the concept as a good idea; some felt it didn’t go far enough. One person stated that maintenance in his company was considered, and always would be considered, a service and cost—the profit-centered philosophy would never be accepted at any level of the company, certainly not by executive and financial management.
By the late 1990s, the profit-centered idea had advanced into the initial concept of physical asset management. In addition to the essentials of profit-centered maintenance, physical asset management expanded to emphasize the cooperative organization, improvement-oriented work culture, human performance excellence, reliability, and risk imperatives. All are necessary within a larger, multifunction, operating process to gain optimum sustainable performance and greatest business results.

A book, written by the author and first published in early 2000, detailed the value-based principles of physical asset management. The book made the case that the key challenge facing operating enterprises wasn’t technology or adoption of optimizing practices—all had been proven beyond doubt—but rather the business value that made them essential for success. This was the fundamental premise of physical asset management.

During the first decade of the twenty-first century, physical asset management, under several naming variants, gradually devolved into a more sophisticated name for maintenance. The profit center value concept, operations maintenance cooperation, empowered workforce, human performance excellence, and a number of other elements considered essential for optimum business/mission performance and effectiveness were subsumed by heavy concentration on administrative controls, maintenance management, and practice.

Late in the decade, the term Operational Excellence began to appear, primarily from leading operating enterprises as their guiding concept for attaining maximum effectiveness, overall operations, and business and mission success. Examining the principles of Operational Excellence as expressed by industry leaders, a number of essentials codified earlier concepts. Engaged visionary leaders, value focus, a working culture committed to excellence in all activities and continuous improvement, optimizing risk and reliability as business imperatives, cooperative, committed ownership throughout the organization, and empowered multifunction improvement action teams to name a few.

Viewing the principles, it became clear that Operational Excellence could be considered the latest stage in an evolution that began almost 20 years earlier with the concept of profit-centered maintenance. In addition to the profit and value focus, Operational Excellence includes production and business/mission optimization for greatest effectiveness and success. It is fully inclusive, compatible with, and supportive of asset management. In fact, the organizational, administrative, and control system specified in the ISO55000 series, Asset Management, are totally applicable to and should be incorporated within Operational Excellence. Think of Operational Excellence as a major river to business/mission success. Lean Six Sigma, energy and control performance excellence, asset management and asset performance excellence, profit-centered maintenance, and other broadly accepted functional improvement practices, production, and business system optimization are tributaries! All are included in, contributing to, and driving Operational Excellence to gain greatest value for the enterprise.

Physical asset management workshops, delivered throughout the world by the author beginning in the late 1990s and continuing during the first decade of the 2000s, gradually shifted emphasis to Operational Excellence. The book mentioned
previously, likewise evolved through four editions, increasing emphasis on the value and human elements that are essential for a successful operating enterprise.

GROWING AWARENESS OF OPERATIONAL EXCELLENCE

As time progressed, several facts became apparent. There is growing awareness of Operational Excellence at executive levels of operating enterprises. Many operating enterprises are implementing or considering Operational Excellence. Most of these have a dedicated executive at the vice president or director level overseeing the effort. Some may call the concept by a different name—the powerful principles remain the same. With this stated, definitions are evolving, and there are few generally accepted implementing details to provide guidance for those assigned responsibility. In one major corporation, overall guidelines for Operational Excellence signed by the CEO were so general and with a number of inconsistencies that individual business units within the corporation developed differing implementations. Books and articles on Operational Excellence have been focused into areas such as the organization, process flow, and alignment of management systems; few address the totality. Furthermore, there is a major disagreement on overall strategy. Should the operating strategy of the enterprise be directed to business growth, improving value gain, continuous improvement, or some combination? All these issues will be addressed and answered.

Many participants at Operational Excellence workshops stated their company had initiated an Operational Excellence program or was considering a program without any details to define the beast beyond the compelling term! The great majority were present to learn and assure the program they were developing, or might be called on to develop, would meet expectations quickly and effectively, thereby providing executive management confidence in Operational Excellence and their personal value, not necessarily in that order! A few stated they had Operational Excellence initiatives in place and were looking for ideas that would make their efforts more effective and successful.

By now, many are wondering where safety is in this concept. In fact, safety and Operational Excellence are interlocking, identical programs. The same procedural basis, working culture, organizational and individual commitment, learning, and continuous improvement required for safety must exist within Operational Excellence. Much more about this will be revealed as the story unfolds. There are many supporting functions. Several have been named, and more will be revealed in the text. Human relations (HR) and personnel and change (improvement) management are highly important. It is the same for engineering, finance, and information technology (IT). For all, the text will focus on requirements and function within Operational Excellence. Several specific practices such as Lean Six Sigma will be identified and their application discussed; many details are left to subject-specific texts.

There you have it, a brief explanation of where we will be going and a bit about the origin. Hope the text will be informative and create value for you.
ACKNOWLEDGMENTS

Developing the concepts and ideas for a book of this type begins from experience, identifying and solving problems, discussions, comments, and suggestions with many, many people. To all I have come in contact with over the years, participants in projects, plant assessments, technical conferences, physical asset management, and operational excellence workshops—my great thanks for sharing your knowledge, your questions, comments, and insight toward building this body of knowledge.

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My appreciation to Dr. P.J. Vlok for allowing me to test many ideas during your reliability, and asset management conferences. Who could have ever guessed that an impromptu trip to the Hollywood sign would have led to a ten year plus friendship! To you and Grahame, many thanks for your great hospitality during memorable visits to South Africa.

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When a manuscript is finally complete, the editorial process is all important to elevate an engineer’s thoughts, and often fractured grammar, to a polished final form. Thanks to Jayshree Saishankar at Wiley, for her involvement and support with this book. Very special thanks to Dhanalakshmi Ram, the copyeditor for the book, Aishwarya Daksinamoorty and Kartika Rajendran, Project Managers and her colleagues in SPi Global who helped craft the draft manuscript into final pages of print which you see within these covers.

Finally, and certainly not least, thanks to my wonderful, and very patient wife Pat for whom I will have to think of another answer to the question: “How much longer are you going to sit behind that computer?”

JOHN MITCHELL

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INTRODUCTION

Peter G. Martin
Vice President Invensys

Operational Excellence is certainly not a new concept. Although perhaps not using the specific term, operating enterprises have been striving to implement Operational Excellence across their production and manufacturing sites for decades. Operational Excellence has meant that an enterprise is running their operations in the best possible manner. Of course, the question is “what does best mean?” Up until a just few years ago, most executives striving for Operational Excellence were working to have the most efficient operations. Therefore, “best” in this context referred to superior operational efficiency. Typically, high efficiency was measured in terms of the following:

- Actual production throughput to maximum potential production throughput
- Actual energy consumption to minimum potential energy consumption
- Actual material consumption to minimum potential material consumption
- Minimum safe headcount.

All of the preceding were to be achieved while maximizing safety and minimizing environmental impact. Therefore, the primary objective of operating enterprises has been to maximize production throughput safely while minimizing energy and material consumptions and human costs. Attaining Operational Excellence has been and continues to be an ongoing challenge for all industrial and mission-centered operating enterprises. In many cases, it is a matter of survival.
Over the past decade, there has been a subtle but highly impactful shift in terms of what industrial leaders are recognizing they must have in order to attain real, sustaining Operational Excellence. The traditional concept focused on increasing operational efficiency has proven to be inadequate. Maximizing efficiency, as daunting a challenge as that is, is no longer enough. This may appear like a fairly limited shift in perspective, but it is not. Traditionally, business executives focused on profitability, and operating personnel focused on efficiency. There was a clear separation between business and operations, and business fared quite well. But over the past decade, this separation of responsibility has led to underperformance. It is important to understand why this change has occurred and what the impact of this change is in terms of how to achieve business/mission Operational Excellence by this new definition.

I was involved with a project spanning much of the past two decades to try to determine what business executives are looking for out of their operations talent and technology. During this period, over 2000 executives from multiple production and manufacturing enterprises were involved in structured interviews, focus groups, and other information-gathering sessions. The objective of this project was to help determine how operations and technologies might be more effectively used to meet executives’ desires and expectations. It is certainly beyond the scope of this book to go into all aspects of what these executives communicated, but one aspect of this project is particularly revealing when discussing Operational Excellence. That is, most executives involved in the project conveyed that one of their biggest concerns was that they had no real-time visibility into where and when they were making and losing money across their enterprises and in their operations. Many expressed frustration that they typically did not know if they were having a good or bad month until 5 or 6 days after the end of the month when they received monthly closing reports from the enterprise resource planning (ERP) system. They indicated that they were often surprised by results. At times, they thought they had a good month, but the results did not support that perspective. At other times, they thought the month was not going very well and found that the closing showed otherwise. They also conveyed that they typically learned of an issue impacting profitability weeks or even longer after the issue had its adverse impact. They indicated that had the issue been known earlier, they could have responded much faster and minimized the negative impact. Many executives related that they felt this was no way to run a business. In fact, a number of executives indicated that they felt their operations were well controlled, while their profitability appeared to be out of control.

At the beginning of this project, we got the impression that the frustration being expressed by the executives had existed for many decades. But on closer analysis, we found that the executives actually believed that this was a fairly recent phenomenon. A number of the executives interviewed who had been with their operations for extended periods actually said that 10 years ago this was not the case. Back then, the operations were well controlled, and profitability was reasonably predictable. Something had changed over the last decade that was throwing the business of industry into turmoil.

Evaluating what may be different today as compared to 10 years ago, we started to focus in on some critical variables associated with the profitability of industrial
operations that had been in flux. The first one we noticed was the price paid for electricity. From a stable commodity, electricity has transformed into a business essential that can undergo large, rapid variations in price, with a corresponding great impact on profitability. Electricity pricing was only the first domino in a chain reaction of variations that impacted industrial enterprises in a similar manner. The production of natural gas typically involves significant amounts of electricity. Since the price of natural gas producers were paying for electricity was fluctuating at unprecedented rates, eventually, the price of natural gas began similar frequent fluctuations. Raw materials used in industrial operations were another critical business essential linked to the profitability of the enterprise that began experiencing real-time variability.

This shift from highly stable inputs to an operating enterprise over extended periods to real-time variability of these same inputs caused managers of industrial businesses to lose control of the profitability of their business. Profitability became completely unpredictable. Viewing inputs to the enterprise separately from operations, executives concluded their profitability was out of control, while their operations were in control.

It is important to understand that the solution to this issue is not merely to measure the business in real time and then provide those real-time measures to the business executives of the company in a similar manner to the monthly measures. The volume and frequency of the real-time information would quickly overwhelm management. The key is to move critical decision rights down the organization: in many cases, right to the front-line operations and maintenance personnel. This requires providing those traditional functions with the real-time business information in the right time frame to make good business decisions contextualized to their function in the operation. That is, industrial companies must consider changing their traditional “laborers” into “performance managers.” This fundamental change to the working culture is an absolutely essential aspect to the success of modern Operational Excellence systems.

This transition of perspective on the front-line personnel from laborers to performance managers has proven to be one of the most challenging stumbling blocks in the quest for true Operational Excellence. It is truly anticultural in many industrial companies. The perspective that front-line personnel are laborers who do not offer much value to the operations in terms of brainpower is a direct consequence of the Industrial Revolution. At this time, a large uneducated and unskilled labor force had to be closely watched and managed, because they could not be trusted to make any operational decisions. Engineers in industrial companies have worked for decades essentially to protect the operation from these laborers by limiting their decision rights and clamping their degrees of freedom. Some of these limitations were required for safety, but many were developed due to a lack of trust of the labor force’s ability to adapt and control anything beyond the production process.

However, today’s operators and maintenance personnel are vastly different from their predecessors. They tend to have much higher levels of education than ever before. And they are comfortable with views of the production processes through computer-based automation systems that have only been possible for the last decade or so. The result is a well-educated work force with high levels of experiential knowledge gained by the expanded real-time view of the process not unlike video games
in which many excel. Continuing to treat such a valuable resource base as traditional laborers is stifling the value they can drive into the business. These valuable resources must become the performance managers of industrial operations. Cultural transitions of this type are typically the most challenging to overcome and are well addressed within the Operational Excellence architecture described in this book.

Moving traditional “laborers” into “performance managers” requires major changes within the organization itself. Agility to accommodate variations in the operating environment quickly demands an end or, at least, a significant modification to the siloed, function-based organization. People throughout the enterprise must work together effectively in teams and essentially in real time to achieve optimal enterprise business/mission objectives. Within this new organizational construct, there must be a much greater awareness of enterprise business/mission objectives, as well as the commitment, ownership, and information absolutely necessary to achieve these objectives safely and sustainably. Perhaps more important, the people themselves have to move into the new order. Human performance excellence demands individuals who are ethical, competent, highly motivated, capable of working effectively in teams, and committed to excellence, continuous improvement, and enterprise business/mission objectives.

Executives likewise have an expanded role in the new model of Operational Excellence; however, in this case, it may be seen as a return to the past. Back to the future so to speak! In the past, it wasn’t unusual for the senior executive of an operating enterprise to have risen from the operating level possessing total familiarity with the details of production. These senior executives had worked with and knew many of the operating people by first name, frequently walked the facility and commanded respect. Since they intimately knew the production process, working-level people were comfortable sharing problems that were quickly recognized and corrected. Over the years, as enterprises became larger, senior executives became less engaged with operations, more focused on business and financial reports, and less aware of the linkage between the two. Operational Excellence requires executives to realize that they are the pacesetters, the beginning of the working culture. They must possess a compelling vision, focus on the technical and human attributes that make the enterprise successful, and drive Operational Excellence with continuing, real commitment, and personal engagement.

Information closes the circle. Real-time information supplied to executives that enable their identifying potentially adverse business/mission essentials while time is available for reaction and correction. Effectively organized real-time information to management and working-level employees to assure operations and efforts are consistently focused on safely gaining greatest value from operations. It is no longer sufficient to wish for the status quo; everyone from top to bottom must be totally focused and actively engaged toward continuous improvement and how to make tomorrow better than today!

The net result of all of these changes is that the definition of Operational Excellence within operating enterprises must also transition in order to provide the desired result. In this emerging real-time industrial business environment, Operational Excellence must not be limited to improving operational efficiency as it once had. The
domain of Operational Excellence must be expanded to include safety, environmental integrity, profitability, good citizenship, risk, reliability, asset integrity, and human performance improvement, as well as operational efficiency. This expanded perspective provides truly daunting challenges to operating enterprises, but challenges that can be met with modern technologies and the full engagement of an evolving talent base across industry.

On first glance, trying to develop an effective Operational Excellence strategy and approach in today’s dynamic operating environment may appear to be a conundrum. But as you traverse through the material herein, you will find a path that will lead to world-class performance through Operational Excellence. It is not an easy or short path, but it will be certainly worth the effort.

This book provides a clear roadmap and detailed guidance to gain effective Operational Excellence. It covers the major areas that must be effectively resolved to move operating enterprises to new and higher levels of safety and environmental integrity, efficiency, effectiveness, and profitability. All greater than previously had been possible and essential for success in the operating environment that exists today and will exist into the future.