Over a very long period of time, in fact from very early stages of human evolution, technology has played a major role in shaping life on earth. The Cambridge Dictionaries of American English (2007) defines the term technology as “the methods for using scientific discoveries for practical purposes,” implying that it is the fusion between science and practice that brings technologies into a meaningful and sensible context. Simple and rudimentary technologies used by ancient civilizations have come a long way, making both the nature and usage more complex and at the same time interesting. Apart from the impact of technology on the creation of and growth of techno-societies of modern civilizations, its influence on the industrial development and wealth generation has never been so obvious. Socio-economic, industrial, and societal development, today, relies so much on hardcore technologies and complex technological solutions, even advancing to the extent of challenging the basic principles of nature and evolution.

The impact of technology is seen today in all areas of daily living; societies and industries are so strongly dependent on high-tech gadgets and advanced applications for existence and survival. Notably, the technological determinism, whether voluntarily or involuntarily, imposed on the modern era has contributed much to enhancing interactivity and connectedness among different societal and/or commercial agents, making the present environments not only interestingly dynamic, but also exposed. As the social and industrial structures crave for novel and innovative solutions to reach high levels of sophistication and excellence, there appears to be a clear growth of inherent complexities with technologies and technical environments as well.

The very early drivers for technological development and exploitations in principal appeared to be pragmatic demands and user needs, which in a way can be described as a process of technology pull. In modern techno-societies and high-tech industrial environments, the technology push also appears to be a specific attribute where technocrats attempt to marvel a targeted group, carving a need and inducing a desire for use. Mass effects of both push and pull cultures have contributed much to the fascinating technological environment that societies and industries experience today, and help shape an ever growing demand for new technologies.

While modern societies seem to have some flexibility in determining their own course for development and use of technologies, the industrial environment is more or less compelled to adapt certain technological solutions in order to stay competitive and commercially successful. For
quite some time, under the current circumstances, this has not been a major issue for competitive advantage, but one for mere survival. Some industrial sectors such as automobile, information and communication, and oil & gas, in fact appear to have been left in a kind of ‘no choice’ mode, where the need to use more robust technological solutions have become more sensitive. While some of those industrial applications, such as data management and communication, are obviously organization-wide, specific application solutions for production, manufacturing, process and infrastructure assets are needed for their daily operations and management. As the desire for change comes into play and when industrial sectors are subjected to trendy re-engineering processes, industrial assets today are inundated with technologies in various forms and shapes, some of which are ludicrous.

Over the last few years, industrial asset management has become the focus of many industries due to their increased risk exposure under current market conditions and subsequent business challenges. Stringent regulatory frameworks, socio-political influences, socio-economic conditions, and evolving technologies, also have placed asset management practice on a continuous track of change. As a result of nature, scale, and pace of change, collaborative networks, integrated data solutions, digital infrastructures, complex application technologies, 24/7 online real-time technology platforms, large-scale information systems and ICT networks seem to have been chosen as very ambitious solutions to significantly enhance operational efficiency and cost effectiveness. A positive result of the current change and re-engineering processes is that novel and innovative technological solutions form the foundation for required sophistication and excellence. Given these circumstances, a serious concern is that ill-defined interfaces and increasing complexities of systems and solutions can lead to greater vulnerability and greater risk. In this context, systematic and smart integration of human and organizational aspects plays a significant role in the interface design process, and this is extremely critical in order to avoid catastrophic events, serious incidents, and subsequent commercial risk.

Perhaps the most important thing related to life with modern technologies, is to learn from past events and not to let history repeat itself. With significant changes in the industrial asset management environment that heavily relies on complex technology-based integrated solutions, it has become more obvious to some of the major industries that systematic and smart integration of human and organizational aspects has a significant impact on the mitigation of commercial risks and enhancement of value creation. In this context, a range of issues comes into play from various perspectives. This covers human and organizational aspects within:

- new technology applications and technology management
- integrated solutions and digital networks
- occupational health and safety issues, societal implications, and ethics related to engineering asset management
- plant economics and lifecycle management
- support, supply, and service integration for industrial assets
- facility design and plant modifications
- quality, change, information, and knowledge management for industrial plants
- decision loops, work processes, technical and safety integrity of industrial plants
- information and communication technologies
- collaborative networks and partnerships
- human performance engineering, performance measurements, and performance incentives for industrial facilities
- human factors in organizational design and management for industrial plants
- micro- and macro-ergonomics for industrial facilities, socio-technical systems approach
- behavioral issues, industrial psychology, working environments, human error, and human reliability
- interface design and implementation for plant management
- description / construction of humans in complex socio-technical systems
- limits of managing industrial assets and complex technologies

This special issue aimed at compiling a set of good quality articles that professionally address some such issues of interest covering various dimensions based on latest empirical research findings, experience with practical industrial
cases, knowledge and expertise on the subject matter, and so on. It includes articles with both theoretical and empirical content, and to some extent also uncovers both successes and failures of technology application/implementation efforts. The chosen articles interestingly cover a wide range of issues, promoting cross-learning, and contributing to the present understanding and the existing body of knowledge.

In the first article, McNamara & Kirakowski, focus on measuring product usability satisfaction as perceived by the user; this can provide developers with valuable insight. They highlight that the concept itself is under-developed, although some measures are formally included in usability evaluations. With regard to the lack of cumulative and systematic research, they propose a conceptualisation and definition of the concept that can aid researchers in the development of valid measures.

The second article, authored by Vayrynen, Hoikkala, Ketola & Latva-Ranta, discusses a nation-wide procedure in Finland, called Occupational Safety Card (OSC), that has been developed to improve occupational safety at shared industrial work sites. This appears to be a necessity in the present industrial context when business networks come into play, and as a result, employees are engaged in simultaneous operations. The authors observe that the coverage of the OSC in Finnish workplace, especially within the manufacturing industry, has been significant since 2005. They describe the process through which the OSC model was developed, present the first analysis of how the frequency of accidents at work varied during the years of implementation at the work sites of early adopters, and evaluate the effects of OSC implementation in the safety management system.

The third article, by Vinnem & Liyanage, explores the operational risk of cargo oil off-loading that involves Floating Production Storage and Off-loading (FPSO) vessels and Shuttle Tankers (ST). This is an issue that still calls for further development because of the challenging dynamic nature of the task, especially when compared to fixed installations, where automated positioning capabilities are used during normal operations and direct manual control by operators takes place under abnormal situations. Effective means and fail-safe interfaces are extremely important to prevent or mitigate the effects of potential operational accidents. The article presents a learning case based on a case-based exploratory study, and illustrates the dynamic human-technical interface of collision risk during off-loading operations. It explains the underlying risk influence factors, and elaborates on the human-dependent risk mitigating strategies.

In the fourth article, Bengtsson highlights condition-based maintenance and argues that so far the focus has been directed towards technical development of e.g. systems and tools for plant/facility maintenance process, and not as much towards methods and how to actually implement and utilize the technical advances. Referring to the Swedish industry, the author underlines that condition based maintenance is not utilized to the extent one would have thought, even if maintenance and maintenance technology has been debated as one key function in achieving profitability and a competitive edge. The article investigates the process of implementing a condition-based maintenance approach, with a specific focus on the interplay between technical constituents and human & organizational factors.

In the fifth article, Wogalter & Mayhorn focus on the use of the Internet and some issues about the validity and reliability of Web site information. They argue that users may use positive judgments about the veracity of the informational content that they encounter on the Internet, which is critical for the success of a Web site. Their research, involving a total of 433 participants, examined several components associated with Web sites that could effect perception about the credibility of information found on Web sites. This article also offers suggestions for information verification.

The sixth article, by Lauche, covers human factors and their implications related to offshore drilling. It also addresses real-time data transfer that is intended to enhance the ability of onshore staff to manage drilling operations more effectively in order to improve productivity. The author argues that human-factor-related issues frequently have been ignored in the process of change. The article presents an assessment of job design in five onshore facilities and question whether they fit their purpose in terms of providing transparency and control over the system state, supporting cooperation and learning, and in terms
of their impact on worker well-being. A comparison between operational centers was made that differentiated between socio-technical innovation and pragmatic solutions, and between vertical integration of disciplines for each operation vs. horizontal integration across different operations. The article illustrates that remote management of assets is feasible, but that the impact on job design and the wider socio-economic implications should be taken into account during the implementation process.

The seventh article by Kleiner & Hendrick addresses organizational design and management factors that are increasingly important to various industrial sectors under present conditions. It reviews fundamental concepts in ergonomics, and specifically describes some key models and methods related to structure and process for the analysis and design of complex work systems. It brings some interesting case studies to the spotlight to help validate and illustrate the perspective and methods recommended.

Clearly, the technical content of this special issue is interestingly varied. It gives a flavour of different challenges in different sectors. Some of these challenges are unique and industry specific, while some are more or less specific to other settings. However, it is the learning process that can make a difference in modern living.

Under the current techno-societal and high-tech industrial environment, it appears that technologies have major influence on sophistication, prestige, and excellence. This seems to be an important part of the new heritage that societies and industries are exposed to, regardless of intent. The question of the day is not about the cause, or if it represents legitimate interests of the majority. It is in fact about how to cope and live successfully in the new digital era with assured safety, reliability, and security. Human, organizational, and technological integration with work/task/operational set-up play a critical role in this context, and, undoubtedly, this special issue makes a contribution to this field.

REFERENCE

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