

Medical technology enables practitioners to collaboratively intervene together with other caregivers to treat patients in a cost-effective and efficient manner.

and social expectations. The impact of these forces may change from time to time, as does their relative significance. In addition, the human factor that interacts with these forces is not constant either, thus submitting an important subject for public debate. Nevertheless, the system is being subjected to mounting pressures from the needs to identify its goals, select and define priorities, and to allocate the limited resources.

Hospitals' rising investment demonstrates their belief in the importance of and the benefit from the deployment of technology. Healthcare organizations have been using a variety of evaluation methodologies to provide alternatives in the delivery of care. They are driven by medical innovation, prospective reimbursement, and societal expectations. In this environment, evaluation methodologies only work if an organization is truly prepared to cancel a project after the initial investment. The flaw in the theory is not its complexity, as some have said, but in the fact that it ignores the psychological and political realities of capital investments [6]. It becomes imperative for providers to make good resource allocations decisions at the outset of their capital budgeting process, and often those decisions are biased towards equipment that has a positive impact on reimbursement. Healthcare providers spent US\$8.25 billion on capital equipment in 1988, compared with US\$8.21 billion in 1987 [7]. A survey of hospitals' spending plans for capital budgets, one that includes equipment and construction, indicates that spending rose during 1992 by 15%, reaching US\$23.6 billion [8].

However, the increasing scarcity of available resources within the hospital community on the one hand and the demand for quality healthcare on the other promoted a public debate and awareness of such a paradoxical economic perspective. New tools for cost and outcomes management include disease management and patient safety initiatives [9]. It is in such an environment that hospitals have begun to manage their fixed assets (i.e., capital investments) and equipment-related operation expenditures better than ever before. As the deployment of medical equipment continuously evolves, its impact on the hospital operations and on the consumption rate of its financial resources increases. The ability to forecast and manage this continual evolution and its subsequent implications has become a major component in all healthcare decisions. In a survey of three large hospitals in Houston, Texas, with a combined licensed bed capacity of about 1,400 beds, the average number of medical devices being used per licensed bed has increased between 1982 and 2002 from four devices per bed to over 17 devices per bed [10]. This illustrates that hospitals are experiencing a continual increase in the number of medical devices used on a per-bed basis. It is therefore imperative that in an industry where the only constant is change, there is a program that

- provides for a guiding strategy for allocation of limited resources
- maximizes the value provided by resources invested in medical technology
- identifies and evaluates technological opportunities or threats
- optimizes priorities in systems integration, facility preparation, and staff planning
- meets or exceeds standards of care
- reduces operating costs
- reduces risk exposure.

Whereas both knowledge and practice patterns of management in general are well organized in today's literature, the management of the healthcare delivery system and that of medical technology in the clinical environment is more fragmented and has not yet reached that level of integration. However, we are beginning to understand the relationship between the methods and information that guide the decisions regarding the management of the medical technology that is being deployed in the highly complex environment of the healthcare delivery system, including the variances among users, applications, and cultures from one hospital to another.

The healthcare delivery system presents a very complex environment where strategy, facilities, equipment, drugs, information, and the full range of human interventions are interacting. It is in this clinical environment that patients in various conditions, staff, temporary skilled labor, and the wide variety of technology converge. The technology that has been developed for and is deployed in the healthcare delivery system ranges from the "smart" facilities within which care is being provided to the products that are used around the provision of healthcare services and to its regulation and management. Technology means merely the use of tools; that is, the involvement of any agent which assists in the performance of a task [11]. Such tools have been introduced at an increasing rate during the past 100 years and include the use of techniques, instruments, materials, systems, and facilities. Of all the factors and resources that will shape the future of the health of mankind, the one that most often stretches the imagination is medical technology. But yet, it is also blamed for contributing to the escalation of healthcare costs without receiving recognition for improving access to and quality and efficiency of the system.

It is, therefore, expected that the only winners are those who use superior strategy and execution. Generally, a superior strategy is the result of the use of market-based demand forecasting. Market-based demand forecasting is a method of estimating future demand for a healthcare organization's services by using a broad range of data that describe the nature of demand within the organization's service area. This provides a fundamental link between strategic planning and financial