The problem of capacity management in Greek Public Hospitals

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Abstract
Several authors have proposed implementations for the theory of constraints (TOC) philosophy in manufacturing organizations. However, TOC can apply with the same success to healthcare organizations, to solve problems of capacity management, reducing the inpatient length of stay and increasing the satisfaction from the offering services as has been proven by international research.
In Greece the lack of sophisticated management techniques in Public Hospitals, has led to long waiting lists and to the dissatisfaction from the offering services. Our research about the implementation of managerial accounting practices in Greek Public Hospitals, except from the lack of cost accounting systems found that there is also a lack of sophisticated managerial accounting techniques like TOC, which could improve the performance and efficiency of public healthcare organizations, increasing the satisfaction for the users of services they offer.

Keywords: theory of constraints, hospitals, efficiency, capacity

JEL Classifications: I12

Introduction

Theory of Constraints (TOC) is a popular business philosophy that was first described by Eli Goldratt (1984) in the early 1980s and has since been used extensively, mainly in industry. It is rather a set of thinking processes than a list of solutions, that provides focus in a world of information overload and uses cause and effect logic to understand what is happening and then to find ways of improving it.
TOC is based on the assumption that organizations are complex systems consisting of resources, which are linked by the (interacting) processes they perform, in order to achieve their goal. The strength of this chain of multiphase processes –as in every chain- is defined by the strength of its single weakest link that means that the ability of the organization to achieve its goal depends at least on a single, and at most on very few constraints, that prevent the organization from achieving a higher level of performance (Goldratt and Cox, 1992). These limiting factors that are frequently described as bottlenecks can be physical such as machines or equipment, policy, behavioral constraints and external constraints.
The common mistake of management according to Goldratt (1984) is the focus on measurement of the local (or departmental) efficiency rather than the measurement of system's efficiency.
Goldratt summarized the application of TOC as having five key steps:
(1) Identify the constraint.
(2) Get the most out of the constraint. There are several ways in which the efficiency of the constraint can be maximized.
(3) Support the constraint through subordinating the non-constraints to the constraint.

(4) Elevate the constraint. The first three steps mainly focus on changing the way the constraint is used without spending money.
(5) Go back to step 1. Goldratt argued that TOC was a continuous process of improvement. Inertia could become the next constraint.

TOC initially attempted to solve problems in production systems of manufacturing firms, but soon incorporated solutions for problems related to marketing and sales (Goldratt, 1994) and to supply chain management (Goldratt et al., 2000). Furthermore, TOC philosophy has been used to explain problems which arise in various service organizations (Siha, 1999) and in public policies (Klein and Debruine, 1995; Dettmer, 1998).

The problem of managing the capacity of Greek Public Hospitals

The Greek National Health System (ESY) suffers from lack of planning and structure (i.e. management) (Abel-Smith et al., 1994; Tountas et al., 2008). The efficiency and effectiveness of public hospitals are at a very low level and despite the precious resources they consume, they offer poor services that, as repeated surveys have shown, do not satisfy the users of the system (Ballas and Tsoukas, 2004).
One of the most important problems that users of ESY face is the long waiting lists. According to the daily newspaper “Ta Nea”, the wait for surgery in Athens hospital is six months (OECD, 2009).
This problem is a capacity problem which is associated with the occupancy rate of hospitals and specific wards, and with the average length of stay in hospital.

The occupancy rate is a calculation used to show the actual utilization of an inpatient health facility for a given time period. It is expressed as a percentage and it is an indicator of “productivity” and efficiency of hospital, very useful for health planning purposes, calculated by the formula:
(Inpatient Days of Care / Bed Days Available) x 100
The calculation of occupancy rates is not limited to the facility as a whole. Occupancy rates are often calculated to determine the utilization of a specific inpatient unit such as orthopedic ward, surgical ward, etc.
A target of occupancy rate of 100% can exist only on a theoretical basis and cannot be easily achieved mainly because of the unpredictable nature of the demand for healthcare services, as also because of seasonable fluctuation in the demand for specific medicine specialties. However, healthcare services provided by a hospital must be available whenever need arises (day and night, on workdays or during holidays). This can cause a cost for underemployment of their factors of production, because a large amount of the hospital costs are fixed costs that do not vary depending on production levels (Gaynor and Anderson, 1995).
On the other hand, when demand exceeds the offer in beds, the occupancy rate is higher than 100% and as a result we have long waiting lists and a jamming of the system, with emergency cases being treated in hospital corridors instead of in wards against the quality of services.

The average length of stay in hospitals is a statistical calculation that it is often used for health planning purposes. The formula for the calculation is as follows:

Average Length of Stay = Total discharge days/ Total Discharges

Total discharge days - The sum of the number of days spent in the hospital for each inpatient that was discharged during the time period examined regardless of when the patient was admitted. For instance, if 5 persons were discharged after 10 days in the hospital and 3 were discharged after 7 days in the hospital, the number of discharge days for these patients would be 71 days (5 x 10 = 50, 3 x 7 = 21, 50 + 21 = 71).

Total discharges - The number of inpatients released from the hospital during the time period examined. This figure includes deaths. Births are excluded unless the infant was transferred to the hospital's neonatal intensive care unit prior to discharge.

The average length of stay is closely related with the patient turnover. Shortened length of stay increases throughput, and produces a more diverse mix of patient case types (casemix as DRGs) (Duffield et al, 2009). As hospitals worldwide strive to become more efficient and use all available beds to capacity, hospital management and consulting literature exhort managers to improve "capacity management" and "maximize patient throughput" (Kobis & Kennedy, 2006).

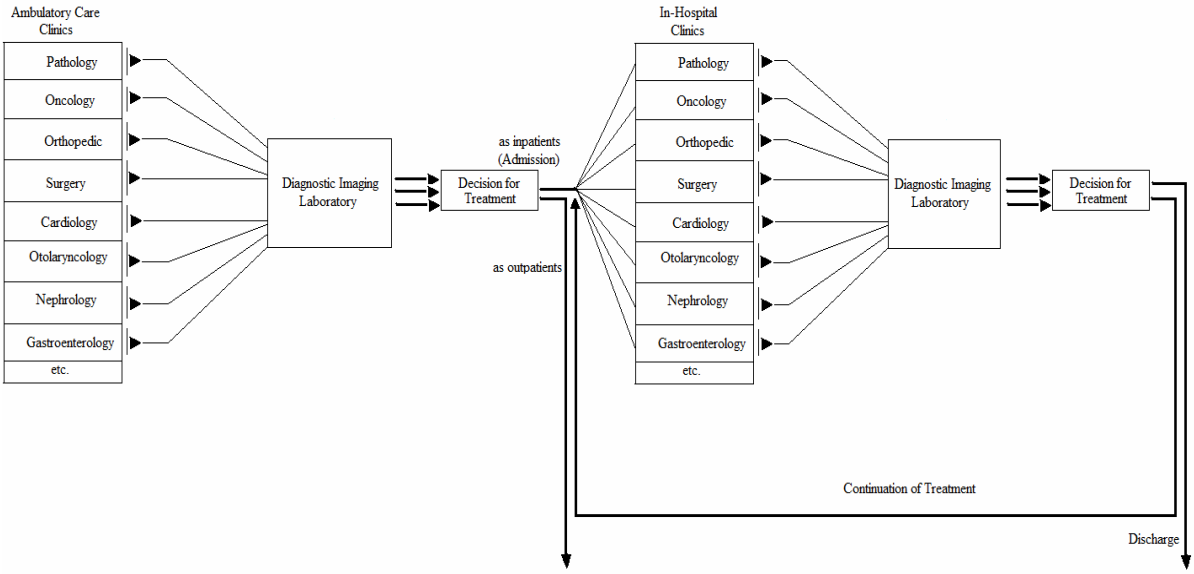
A Theory of constraints approach to the problem

Our research that was conducted in Greek public hospitals, and concerned the implementation of sophisticated managerial accounting practices in them, brought the problem of capacity management to light. Our empirical material was drawn from interviews, conducted in the last four months of 2006, with five medical Directors of clinics from five hospitals. Each interview lasted at least one hour and notes were taken. The interviewees answered questions about the problems they face in the operation of their clinics from a managerial perspective and the problem that was reported more frequently was the difficulty in the management of the capacity. The Medical Directors focused not on the capacity of their own clinic, but on the jam that is noticed in them from the low capacity mainly of the diagnostic imaging laboratories.

The problem described as follows:

The vast majority of hospital outpatients who use the ambulatory care services hospitals offer, need diagnostic imaging tests in order to identify their problem, and decide on the treatment that may require admission in hospital. Moreover, inpatients from almost all clinics of a hospital (pathology, orthopedic, surgery, oncology, cardiology, neurology, otolaryngology, etc.) need diagnostic imaging tests and before their discharge in order to realize that their health problem is solved or improved. As a result, the diagnostic imaging laboratories become the bottlenecks of hospitals, forcing all the other clinics that need their services, to move at the pace of their slow step (Figure 1).

Figure 1. Modeling the process of admission and discharge in a Greek hospital



During the interviews, reported cases that had an even 8-day delay to be discharged because that was the waiting time for a triplex test or an axial tomography in order to verify the therapy. This delay which increases the stay of length leads to an increase of the costs per patient, reducing at the same time the throughput for the hospital.

The solution of the problem described above can be found in the thinking process of the theory of constraints. Although service organizations (as healthcare organizations) do not manufacture products and some of them are not-for-profit organizations (as in our case the public hospitals) we can apply the TOC thinking process to them reevaluating and defining the basic measurements needed to guide decisions and provide essential feedback on improvement (Motwani & Klein & Harowitz , 1996).

The experience from the application of TOC in Healthcare organizations in other countries, has proven that it contributes significantly to the detection of bottlenecks within the systems and to the efforts for the normalization of patient flow, increasing the whole capacity of hospitals (Garner & Bailey, 1992; Kershaw, 2000; Motwani & Klein & Harowitz , 1996; Phipps, 1999).

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