Planning A Strategic Information System For A Market-Oriented Non-Profit Organization

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When non-profit organizations take on a market orientation, information needs become more extensive and comprehensive. This case study illustrates the strategic planning process that was successfully used to develop a new market-oriented information system in a Hong Kong hospital. Perhaps other organizations can learn from this case to better manage marketing efforts and internal operations.

The transition of Asian and Eastern European macro economies to a market-orientation has been well-documented. However, strong movements towards markets are also taking place at the micro economic level. There is a global trend to separate the responsibility for providing public services from government's other traditional roles, such as enacting legislation and representing its people. Health care providers have been part of this general transition. Although some private, profit-making health care companies have flourished (notably in the United States), many previously government-run institutions retain a non-profit status. Such organizations become more self-sufficient, more market-oriented and are increasingly accountable to

their community. Since the information needs of these new non-profit organizations are more extensive and comprehensive than before, the need for good information systems management increases.

In Hong Kong, the government has established a private organization, the Hospital Authority, to oversee all the government and subvended medical resources in the territory. The New Baltic Hospital (NBH)[1] is nearly two dozen government or quasi-government hospitals which are affected by this recent policy change.

Throughout its thirty year history, the New Baltic had been managed and operated directly by the health depart-

ment of the Hong Kong government. Traditionally, some 75 percent of its expenses are paid from government subsidies, with a further 15 percent being covered by private donors. The hospital's patient base of 400,000 had only paid nominal amounts for pay as-you-go medical care.

The Hospital Authority has a mandate to plan and manage all the hospital activities in Hong Kong. Political leaders felt that greater cost-effectiveness was possible by creating an arms-length relationship with the government, increasing the coordination between hospitals and utilizing the economies of scale available with nearly six million residents in the territory. This was evident when the creation of the Hospi-

tal Authority was linked to another announcement which slashed public subsidies to the hospitals by 60 percent over a three year period.

The New Baltic Hospital has had to adapt not only to drastic public funding reductions, but also to greater management autonomy in key areas, growing accountability to the community and a reporting relationship with the new Hospital Authority. Senior management at the institution recognized that they faced a very different and challenging situation.

Dr. Leung was the hospital's chief administrator, heading a typically Confucian rigid hierarchy. Although he had only been in post for a few months, he quickly recognized that the new government policy would necessitate considerable change at the New Baltic. He realized that it would be essential to adopt a "market orientation", which focused outward to the community. The present "product orientation", which concentrated on internal self-improvement, would no longer be appropriate.

Market Orientation For a Non-Profit Organization

Concerns about the needs of patients (the market) and the profitability of various market segments had previously been a lower priority for many NBH administrators and medical staff. They would now be crucial in creating an image of care, dedication, efficiency and value for money which would enable the New Baltic to serve its community and to compete against other facilities in attracting money from donors and raising additional revenues from patients.

NBH staff had become quite enamored with the quality and sophistication of the resident expertise and the leading-edge medical technology which surrounded them. However, now these products and resources would only be important as a means to an end. They would attract and satisfy a base of paying customers, by providing cost-effective medical services. Equally important, volunteers and financial donors would be inclined to associate themselves with a visible and respected public service organization.

Success as a market-oriented organization would require increased effectiveness coupled with a greater focus on efficiency and cost-consciousness. This would be a dramatic change for the organization and its culture, but was imperative for the New Baltic. Dr. Leung knew that certain analyses were needed before a market-oriented plan could be created. The profitability of different service offerings as well as the revenue generating potential and needs (both present and future) of various patient groups would have to be thoroughly understood. The New Baltic Hospital would need a new information system to help them both initiate and monitor these endeavors.

Dr. Leung had read about organizations using information systems technology to support their marketing initiatives. He was aware that pharmaceutical firms and the airlines were using information systems to effective lock in their markets by raising both switching costs for customers and entry barriers for competitors.

Reports of strategic information systems in Hong Kong were also impressive. The Hong Kong and Shanghai Banking Corporation's rapid growth to a position as one of the world's ten biggest banks has been largely facilitated by its early development of global electronic banking services, while Cathay Pacific's customer database helped the airline attract and retain its highly-profitable first and business class clientele (Martinsons, 1990). Dr. Leung was confident that a non-profit organization like the New Baltic Hospital could similarly use its information resources in a strategic manner.

The Organization

While this new business strategy, and the means of achieving it, were being planned at the hospital, the New Baltic organization had already been restructured. To support its new service focus, there were now three distinct divisions. They had between 135 and 370 full-time employees and provided in-patient services, ambulatory services and promoted community health. The division heads reported directly to Dr. Leung and their staff made extensive use of seven support departments within the hospital, which included accounting, research and information services. Each department had a relatively small number of staff, who had broad responsibilities and reported to either a head or a supervisor a level down the hierarchy.

Information services had four analysts, three programmers and eleven other systems people in addition to the department's management head. It was responsible for developing and modifying specific computer applications, providing technical support and advice to the service divisions, and operating the hospital's data center. This center included the patient records (very few of which were computerized), assorted financial and accounting data and a small personnel database.

Together with Dr. Leung, the division and department heads constituted the senior management group at the New Baltic. After reviewing his idea with two experienced strategic information planning consultants, Dr. Leung presented a proposal for a strategic information system to these executives. It received a fairly favorable response amidst a lot of queries seeking clarification. After further explaining the concept, he specifically requested the division and department heads to identify their present information needs and additional requirements for the future that they could foresee.

Simultaneously, Mr. Wong, the head of information services, was asked to consider potential improvements to existing information systems at the hospital. He was told to consider a hospital information system which would ideally suit the institution's new operating environment, identifying what could be done to help management and the information which could

be made available for tactical and strategic decision-making.

The concept of a market-oriented hospital information system was a familiar one to these managers and medical professionals. They had spent their careers in the public service sector, where information systems were fairly basic and focused on accounting and financial reporting. Nevertheless, they began thinking about their particular information needs.

The New Baltic had two target markets: its patients and its donors. Patients would have to be persuaded that NBH best met their needs, by offering the best services at a reasonable price, and by helping them in their time of need. Donors would have to be approached more aggressively and systematically. They would have to be convinced that their money would be well spent, that the hospital was worthy of their donations, and that the donations would be suitably recognized.

Decision Areas And Information Needs

In the future, a large number of different decisions would need to be made. They could be broadly divided into three categories, relating to the hospital's service mix, its pricing policy and its promotional activities.

Since NBH was offering a variety of in-patient and ambulatory services, periodic reviews would be needed, to determine their utilization and profitability, and to take account of changing patient needs and other health care offerings in the community. New Baltic's promotion of health education and associated medical services would have to respond to the community's needs, which are continually evolving amidst Hong Kong's dynamic social and business environment.

The government hospitals were all charging the same rates, but now that cost-recovery was needed, the New Baltic's service pricing would require regular reviews. Operating costs which exceeded patient billings would have

to covered by subsidies and donations, requiring more aggressive government lobbying and implementation of a comprehensive fund-raising strategy. NBH would have to improve its image and raise its public profile. The hospital now had to understand its potential patient base, in terms of spending power, demographics and medical needs. Meanwhile, these prospective customers should be made aware of NBH's multiple services and their prices.

The hospital management currently had no easy access to much of the data that would be needed in regular reports. Furthermore, there would probably be more ad hoc requests, since it was difficult to predict the decisions that would have to made as the hospital evolved. However, several managers stressed that they did not want to be inundated by useless information. They were busy people and had heard horror stories about "information overload". Their peers in other non-profit organizations had frequently commented on the difficulties they had extracting important information from the numerous reports which kept landing on their desks.

Existing Information Systems

Mr. Wong noted that NBH's existing information systems could be grouped into three categories: medical records, financial records, and personnel records. The medical records system consisted of 350,000 paper records. About 3,000 of these were being manually updated each day. A typical patient's record included name, address, age, diagnosis, date of care, length of stay, supplies used, and the name of the attending physician(s). With new records being added at a steady rate of 5,000 per month, it was getting increasingly difficult to organize them in the data center.

This data management problem was creating problems for those needing to quickly access specific information. In the past year, forty-five cases where a patient's record could not be found within a reasonable time had been documented. However, the divi-

sion heads felt that the formally-reported problems represented only the "tip of the iceberg". Comments from several medical professionals in each operating division supported this view. It seemed that in literally hundreds of instances each month, missing records were not being formally reported or critical situations were being made worse by delays in access to vital patient information.

Although the medical people generally felt that the manual patient record-keeping system was inadequate, the senior administrators had made no plans to modify or automate it. Comparatively low clerical salaries in the Hongkong labor market had made it difficult to justify the wide-spread application of information technology in the past. It had always been assumed that a very large technology investment would be needed to convert the huge volumes of existing data and to make a computerized system responsive to assorted needs. Such a capital expenditure, exclusively to prevent a few patient records from going astray, was "simply not in the cards".

The accounting and finance people were using a well-established, computerized information system, which time-shared one of the health department's minicomputers. This enabled the storage and processing of data related to costs, revenues, billings, assets and liabilities. Billing information included details on room and ancillary charges for each customer. Although this system produced regular reports, no on-line inquiries were possible.

The financial information system was generally felt to be satisfactory, because it met the hospital's basic needs in this functional area. It could account for the use of funds provided by various sources, enable the analysis of cost trends, and be used to support requests for special funding of capital initiatives. While it was commonly felt that having interactive access to the data

would be beneficial, both the financial staff and those with whom they interacted had learned to work effectively without this capability.

The personnel department also had a computerized application, although a relatively unsophisticated one. A database management system on a single microcomputer tracked all the nursing, medical and administrative staff. Data included the staff member's name, department, title and rank, date of birth, net credited service date as well as normal, shift and overtime pay rates. The payroll system for all the hospital's staff below the executive level, which used this data as the primary input, was generally felt to operate in a satisfactory manner. However, the assignment of shift duties and vacation scheduling was done manually by ward supervisors.

Although historical resource endowments to the hospital were quite generous, capital expenditures on medical equipment had been a higher priority than those on information technology. Capital and operating expenses for information services had averaged 2.3 percent of the hospital's total budget over the last five years. As a result, the medical, financial and personnel information systems could be described as unimpressive, but adequate to meet the organization's needs for record-keeping and reporting in its traditional operating environment.

Planning A New System
The hospital managers knew that in a market-oriented environment, an information system and its information outputs would have to be based on the needs of the hospital and the two primary groups with whom it was seeking to establish and/or build relationships: patients in the immediate community and potential donors in Hong Kong and throughout the world.

The necessity of having timely and accurate information available to support the hospital's business needs was recognized by all the senior managers. However, explicitly identifying these business needs in a non-profit organization which was now reporting to the Hospital Authority proved difficult and involved considerable discussion. It helped to frequently reference New Baltic's existing organizational plans and to consult several times with officials at the Hospital Authority.

The New Baltic Hospital's mission (loosely defined as its main, transcending reason for existing within its community) is to serve as a medical diagnostic and treatment center and to deliver health care services to the neighboring population. Its objectives are to provide excellent medical care and to meet the health care needs of the community. In beginning to plan this new system, the senior managers agreed that they should relate their information needs to specific factors which would be critical to achieve the following:

1.Provide a high quality of service. This would be possible through the provision of a civilized and caring institutional environment and personnel attitudes.

2.Facilitate an efficient patient flow through the referral, admission, treatment and discharge processes.

3.Deliver clinical cures due to the efficiency of its treatment program.

4.Integrate and coordinate the services and information within the hospital and related institutions.

5.Create empathy with the patient's family and relatives by providing custodial care and emotional support.

To be successful in the longer term, the New Baltic Hospital would have to differentiate itself from other health and medical care organizations operating in its vicinity, be a cost-effective provider of basic health and medical care services and cultivate its favorable public image with both patients and potential donors. The implementation of such strategic thrusts would require the extensive collection, processing and analysis of various data about the organization and its environment. Access to the resulting information was deemed critical for a wide array of decisions.

Several of the managers had initially been skeptical about spending so much time to consider NBH's mission, goals and factors for success. After all, they all had day-to-day operations to manage and many other issues to consider. However, in retrospect, they generally agreed that gaining a better understanding of the organization's business and becoming aware of each other's perspectives were necessary preludes for specifying the market-oriented information system requirements which would support their business information needs.

Several of the managers commented that participation in these sessions subsequently helped focus their work on the next stage of systems planning. The divisions and departments each considered the types of decisions that they would be making, or could reasonably be asked to make, in the hospital's new market-oriented operating environment. By identifying such decision areas and carefully analyzing the related processes, the managers could list the information which would improve the quality or speed of the decision-making process.

Internal staff discussions, detailed investigations of the existing work environment, as well as the creation and evaluation of plausible future scenarios took several more weeks. However, this intensive work produced a comprehensive list of the hospital's information needs, grouped under three headings: essential, important (but not essential) and nice to have. Predictably, the managers and their subordinates had put most of their identified information needs under the first heading. They were acutely aware that proportional budget cutting was a common practice in non-profit organizations. Each division and department head sought to ensure that any cutbacks

or alterations during the subsequent system development process would have the minimum adverse affect on their stated requirements. Dr. Leung recognized this political game, but felt that it was far better to have the strategic system provide some excess information than fail to have something which was vital in a given situation.

For each type of information, a corresponding data source was also identified. It was noted that while some data for a marketing information system could be found internally, that related to the patient base and competitors would have to be collected from outside. The required internal marketing and marketing intelligence data are as follows:

A. Internal Marketing Data

Number of daily admissions and discharges, by service, diagnosis, physician, source of payment, patient origin, source of referral, patient age, average length of stay.

Medical staff numbers, credentials, speciality, age, practice plans, office location, use of ancillary services and operating room, diagnoses, other hospital affiliations, charge rates and personnel data.

Emergency/ambulatory service utilization with gross utilization rate, by shift, time of year, day of week, source of payment, patient origin, diagnosis, community, time in waiting area and percentage of ambulance runs.

Financial information such as costs, patient charges and profitability by department, patients, age of patient, community origin, diagnosis, physician, source of referral, with the ability to extract totals, averages and determine trends.

Donor information including name, address, category, donation history, use of money, promotion exposure.

B. Marketing Intelligence Data

Hospital service area characteristics including population size and growth rate, demographics and alternative, non-hospital medical services.
Competitor profiles including capacity and utilization of various resources, characteristics of populations served,

service expansion or alteration plans, staff composition and specialties.

In addition to documenting the information needed to make the hospital successful in its new environment, a thorough review of the present systems was undertaken. Mr. Wong defended his department's efforts in doing its best to ensure smooth data operations. However, the existence of an installed base of disconnected, incomplete and incompatible manual and computerized systems would complicate development and implementation process. The organization's traditional data processing applications were inadequate to provide useful information for de-

ciding on the mix of services to be offered, the prices to be charged, and the marketing efforts to be undertaken.

Data which was required for decision-making often existed within the data center or elsewhere in the organization, but it was difficult to integrate data across the different systems. For example, patient profitability analyses require cost and revenue data from the financial sub-system, patient and care details from the service records, and salary costs of attending physicians and other staff from their personnel records. Administrative and promo-
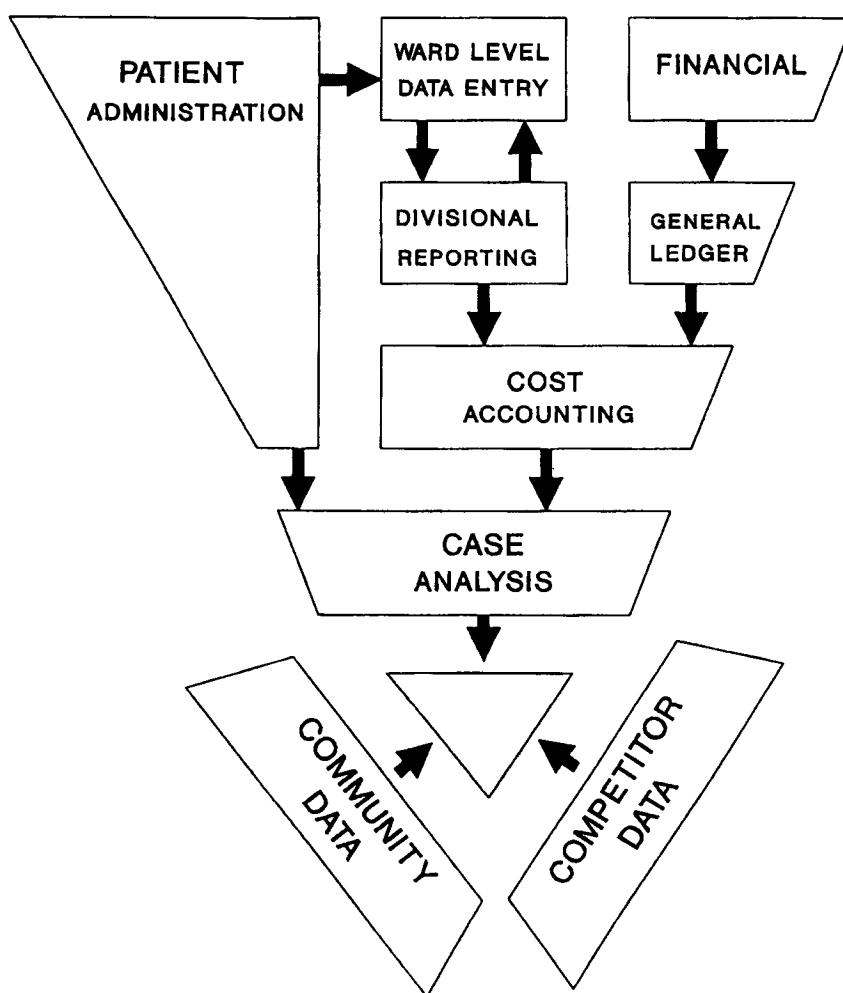
New Baltic Hospital
Strategic Information System Model
Figure 1

tion expenses must also be from data included in the calculations.

Developing A New System

The implementation of a comprehensive new information processing system not only offered an attractive return on investment, but was also of strategic importance. A Strategic System Steering Committee (commonly referred to as the 3S Committee) reviewed the system requirements and, together with a strategic information planning consultant, oversaw the design of this market-oriented system.

Based on the new requirements, it was decided that while parts of the computerized finance and accounting system were adequate, a complete reconstruction of the medical and personnel data systems would be needed. Mr. Wong knew that his staff could not complete the entire task alone.

With the assistance of two consultants, the model shown in Figure 1 was used as the basis for designing an appropriate system. The patient administration sub-system includes personal data on the customers and that related to their admission, treatment and discharge. Separately, a financial sub-system, complete with general ledger, is largely an update from its time-shared incarnation. It closely integrates data related to materials and facilities management, personnel and payroll. The patient-related data feeds into first a ward-level data base and then a division-level operations reporting sub-system, which in turn is combined with the financial sub-system to derive procedure-level cost accounting information.

Direct amalgamation of the patient administration sub-system with this accounting data is useful for "case analysis". Here the costs associated with different diagnoses, various services and even, perhaps controversially, the productivity of staff members can be accessed. These internal sub-systems are combined with two marketing intelligence sub-systems, one profiling the potential customers and a second containing competitive data (on facilities and potential donors) to support strategic decision-making by the senior executives.

The development of this strategic system is being carried out in a modular fashion on a personal computer-based local area network. A phased approach is advantageous for budgetary reasons, allows the senior managers to have their most essential needs met relatively quickly and enables an initial review of the strategic information system so that subsequent modules can be modified with minimum extra costs or schedule delays. A microcomputer network was chosen because it was deemed cost-effective, easy to administer, flexible for future expansion and enabled the use of off-the-shelf software. These commercial packages include capabilities for database management, spreadsheeting and inter-office communications. With a limited amount of integrative programming, all the design requirements could be met and the developed system would be relatively easy to use. In addition, it gives the hospital technological compatibility with the Hospital Authority's own small computing system.

After nine months of work by a dedicated four person project team, the first phase of an integrated management information system was implemented on schedule at the New Baltic Hospital. As work on the other modules continues, the reaction to the initial modules has be quite favorable. Dr. Leung is busy studying the hospital's capacity utilization trends and reconciling actual results with his budget, the division heads are considering where productivity might be improved without affecting patient care while the clinical staff are comparing the costs of out-patient and in-ward treatment.

Since all these end users participated in the planning process and reviewed the design, it is not surprising that there is little resistance to the system at the New Baltic Hospital. Hongkong's high levels of personal computer literacy were also a factor in the surprisingly small amounts of operational problems reported in the first months after implementation, even with only minimal system training given to, or requested by the staff.

However, the patient administration sub-system and the massive conversion of hand-written medical records are expected to provide the largest challenge to the system development team. It will be among the last modules of the strategic system design to be fully developed and put into operation. This is partly because it is hoped that such a delay will facilitate the use of a new generation of technology to ease the implementation process.

The development project is significantly over budget at the present time, because of Hong Kong's high inflation rate, systems staff turnover and some requests for design modifications. However, Dr. Leung and his fellow managers are committed to developing the complete system. They know it is not simply a matter of short-term costs and tangible benefits. Without this strategic information system, the hospital could not compete in its new role as a market-oriented, non-profit health care organization.

The Bottom Line

The information requirements for marketing decisions in this non-profit organization are quite similar to those of profit-seeking enterprises. The management at the New Baltic Hospital is not alone in feeling that a market-oriented information system is a difficult concept to appreciate and make operational in a large, non-profit organizational setting. The concept of a market-oriented information system is even alien to many managers and information system professionals working in the private sector. In most enterprises, marketing has lagged behind other functional areas in terms of developing IS applications.

Packer (1990) reports that information system budgets, as a percentage of overall costs, are increasing in hos-

pitals of all sizes. In selective cases, they are now approaching the ten percent of total operating budgets which characterizes the most information-intensive industries. As labor costs rise, the shortage of skilled labor continues in economies like Hongkong, and the price-performance ratios of information technology fall, this growth trend will continue.

Although non-profit organizations may have differing business environments and information system objectives, the importance of systematic information management will increase, as senior executives like Dr. Leung recognize the strategic potential of information technology and the need to link information resource planning to the overall strategy of the non-profit organization.

Non-profit organizations rely heavily on outsiders when planning and implementing new systems, because their managers either lack the confidence or the internal expertise to make their own IS decisions. However, this case demonstrates that a structured process which involves senior managers can be used to achieve two important goals which face non-profit organizations taking on an increased market-orientation.

The first is to effectively plan and design a strategic information system with the minimum involvement of outside consultants. The second is to get professionals to work as a management team on issues which cut across individual areas of responsibility and affect the new organization's future in a competitive market. Information systems planning cannot be done without an awareness of the environment and organization's relevant business needs. With strategic information systems, both a structured process and the senior management involvement are critical success factors.

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Although this case is real, the name of the hospital and its managers have been altered.