

Investing in Information Technology: Where Do Canadian Hospitals Stand?

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Investments in information technology (IT) can have a significant impact on an organization's performance. Well-managed IT investments that are carefully selected and focused on meeting defined needs can propel an organization forward, improving performance while reducing costs. Likewise, poor investments, those that are inadequately justified or whose costs, risks and benefits are poorly managed, can hinder and even restrict an organization's performance.

Investing in information technology (the hardware, software and human capital to mobilize it) in hospitals is a complicated issue. It competes with other pressing matters facing hospital management, such as capital spending on diagnostic and therapeutic equipment, the need for more nursing to address more complex patient needs, the difficulty in managing operating costs in a funding-strained environment, and achieving efficient, effective and high-quality care processes.

The visionary CIO or Director of Information Services will be able to envisage a myriad of IT or Information Management applications that may be able to alleviate or minimize some of these pressures. However, the vision may not reach the decision-makers, or in some cases the proposed solution may carry a heavy cost burden that the organization is just unwilling or unable to incur at the time. It is a situation that many hospitals are facing across Canada.

Those who are ready to make some type of investment are left with the question: How much? A recent study by the Governance

Institute has indicated that about one-third of hospital boards are becoming more involved in IT purchases.¹ Boards need information to make decisions on large investments, such as clinical information systems, and in doing so, they try to identify an industry standard or at least an understanding of what their peers are spending.

One of the proxy measures that can be employed to gauge the investment made in IT and its importance for the organization is spending on IT relative to total hospital operating costs. This measure can then be used for comparison among hospitals and even across different industries.

The recently released 2001 CIHI/HayGroup Benchmarking Comparison of Canadian Hospitals can provide a better understanding of the investment of IT in Canadian hospitals. The Benchmarking Comparison is an annual study that provides participating hospitals with comparisons of the clinical efficiency, operational efficiency and quality of care of Canadian teaching and community hospitals. A number of hospital financial and productivity indicators, including the derivation of costs with respect to information systems, can be extracted from the study's benchmarking databases.

CURRENT INVESTMENT IN IT

In order to gain an understanding of the level of investment in IT among participant hospitals, data were extracted from the study and measurements were made on an aggregate level, taking

1. Governance Institute: Investing in Information Technology, April 2001.

into consideration all the participating hospitals.² In 2000/01 participants included 59 of Canada's leading hospitals and health systems operating 144 hospital sites. Of these, 24 included teaching hospitals and 35 were composed of community hospitals. Financial and statistical data submitted by hospitals were used to calculate the Information Systems (IS) Net Cost as a percentage of Total Hospital Net Operating Costs for each hospital.³ The numerator and denominator for this indicator are defined in more detail below:

Numerator: Information Systems Net Cost

The net costs of information systems functional centre plus any information systems costs reported in other functional centres.

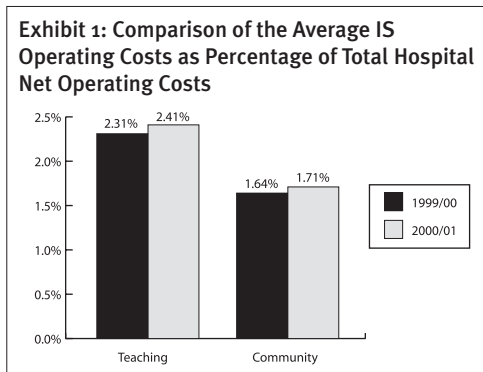
Denominator: Total Hospital Net Operating Cost

Cost which includes all reported operating costs, except equipment, medical staff costs and one-time restructuring costs, less recoveries.

On average, operating costs associated with IT in teaching hospitals account for 2.41% of total hospital operating costs, whereas in community hospitals they account for 1.71%. This represents a 30% higher expenditure on IT in teaching hospitals compared to community hospitals. Reasons for higher operating costs of IT in teaching hospitals compared to community hospitals may be due to the differences in complexity of care, organizational complexity of academic health centres versus community general hospitals and greater reliance on technology. These differences may contribute to the need for greater investment in IT to support a larger and more complex information infrastructure. Teaching hospitals ranged from a minimum of

1.12% to a maximum of 3.71% on this indicator. There was more variation in the community hospitals, where the minimum was 0.13% IS operating costs as a percentage of total hospital operating costs to a maximum of 3.57%.

Comparing these averages to last year (1999/00) it is evident that information systems operating costs as a percentage of total operating costs have not changed that significantly. Exhibit 1 indicates a slight increase in both teaching and community hospital expenditure on information technology.



In order to understand the distribution of this indicator across the participating hospitals, the 25th percentile, median and 75th percentile were calculated for teaching and community hospitals separately. The 25th percentile for this indicator is the level where one-quarter of the hospitals had lower values and three-quarters of the hospitals had higher values. The median for this indicator is the level where half of the hospitals had lower values and half had higher values. The 75th percentile for this indicator is the level where three-quarters of the hospitals had lower values and one-quarter of the hospitals had higher values.

Exhibit 2 indicates only 25% of teaching hospitals in the study have reported information systems operating costs equal to or greater than 2.64% of total hospital operating costs. Looking

Table 1: IS Operating Costs as a Percentage of Total Hospital Net Operating Costs

Hospital Type	Average	Minimum	Maximum
Teaching	2.41%	1.12%	3.71%
Community	1.71%	0.13%	3.57%

2. The CIHI/HayGroup Comparison of Canadian Hospitals is a private annual study, of which databases and hospital-specific results are available only to participants. For the purposes of this article, all hospital-specific data are rolled up and presented in summary format.

3. The term Information Systems, as it is used here, is a reference to the MIS-functional centre nomenclature. However, in addition to the physical information systems, it includes the associated software and human resources costs. Information Technology, we feel, is a more modern description of the components of cost that make up the Information Systems functional centre and as such is used interchangeably.

Exhibit 2: IS Operating Costs as Percentage of Total Hospital Net Operating Costs by Percentile for Teaching Hospitals

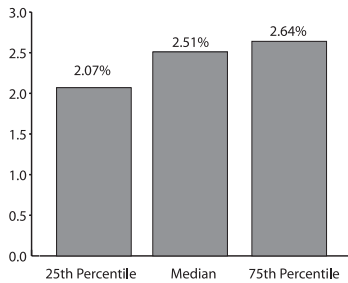
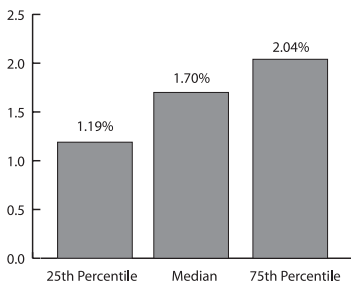


Exhibit 3: IS Operating Costs as Percentage of Total Hospital Net Operating Costs by Percentile for Community Hospitals



at it another way, the 75th percentile indicates that 75% of the hospitals in the study have reported information systems operating costs less than or equal to 2.64% of total hospital operating costs.

In community hospitals, IT investment looks to be further restrained. Exhibit 3 shows that 75% of community hospitals in the study have reported information systems operating costs less than or equal to 2.04% of total hospital operating costs.

The difference in the median investment is almost 50% higher in teaching hospitals. The above percentile analysis of IS operating costs as a proportion of total hospital operating costs by type of hospital exacerbates the differences between community and teaching hospital investment in IT.

WHAT ARE THE DATA LIMITATIONS?

As in any case, the reader is cautioned that there are certain caveats to consider in the interpretation of this data. The data source used for these measurements are hospital-reported financial/statistical data by functional centre. Although hos-

pitals follow MIS guidelines in their reporting format, the method by which hospitals report information systems costs may not always be consistent.

For example, some hospitals may have distributed information services support staff, while others have centralized these support functions. Also, as technology advances in hospital diagnostic departments (e.g., laboratory, imaging), more diagnostic staff may be performing information services support duties, and these may not necessarily be captured in the IS functional centre.

Another issue relates to equipment and software amortization and/or lease costs (equipment acquisition costs). These costs make up a significant portion of IS costs and are not included in these comparisons. The reason for this is that depreciation is treated differently from province to province. If equipment acquisition costs were included, they could provide a different picture of IT investment. However, depending on how these costs are distributed, they may not be an accurate representation of IS costs. For example, the depreciation for a PC in Administration is not separated from depreciation for a new boardroom table; in Diagnostic Imaging, depreciation for a server is not separated from depreciation for an X-ray machine. These caveats to the data require hospitals to be more vigilant in promoting consistency in financial reporting in order to support such comparisons.

OBSTACLES TO IT INVESTMENT

Given the highly information-intensive environment, IT is becoming more strategically important in healthcare. However, the sizable capital expenditure and risks involved in IT investments lead organizations to carefully determine the value associated with IT projects and initiatives. So where are we now? Current data suggest that there is a conservative approach to investing in IT at Canadian hospitals. In 2000/01, on average teaching hospitals in Canada spent 2.41% of total hospital operating costs on information technology, while community hospitals spent 1.71%.

Compared to the financial services industry (one of similar information intensity) healthcare is far behind. The financial services industry is

devoting approximately 12% of its revenues (which includes capital and lease spending) on information systems.⁴ There are many reasons as to why IT investment in Canadian hospitals is less than 3% of total operating expenditures. Perhaps one of the most compelling is the difficulty in proving return on investment. Quantifying improvements in work flow and business processes is possible, but showing that investment in IT has a direct impact on improving clinical processes and/or quality of care is not as easily done. However, clinical informaticians are making headway by postulating that IT can reduce the incidence of clinical errors (e.g., reducing adverse drug events) and reduce the incidence of inappropriate diagnostic testing (e.g., reducing unnecessary exams/tests).

Hospital restructuring across the country has imposed a substantial financial burden, making it difficult for organizations to engage in IT projects. Thus, inadequate financial support from the government is another reason for lack of IT investment. However, the reasons are not only those of funding. Given the nascent stage of healthcare information technology, many hospitals complain that the vendors themselves don't understand their needs. Clinical Information Systems and the new wave of Electronic Health Records are huge implementations and often need significant customization to fit the needs and idiosyncrasies of the hospital organization. There are also issues with recruitment of IT staff, as it is difficult for healthcare to compete with the likes of Oracle and Microsoft for experienced and skilled IT human resources. Finally, many hospitals lack the specific direction that an Information Technology/Information Management strategic plan would afford them, specifically in outlining the type of investment needed and how to achieve their IT/IM objectives.

CONCLUSION

Total spending on IT in Canadian hospitals has been reported to be 1% to 2% of operating spending. However, further work needs to be done to standardize the way hospitals account for spending on information technology. The tracking of capital depreciation, amortization and leasing costs needs to be improved so as to provide a more comprehensive picture of hospital investments, in particular in IT.

The data suggest differences in the way operating dollars are spent on IT in teaching hospitals as compared to community hospitals. More study needs to be undertaken to understand why teaching hospitals and community hospitals have substantially different spending on information technology.

Canada Health Infoway has just undertaken a major study to understand detailed hospital spending on health information technology. The data derived from this new study should improve our understanding of hospital spending on IT. **e**

About the Author

Sanjay Cherian is a management consultant with the Hay Health Care Consulting Group providing assistance in the areas of performance measurement and operations analysis. He is also a principal consultant supporting the CIHI/HayGroup Annual Benchmarking Comparisons of Canadian Hospitals.

4. Gartner Group, Ontario Health Information Management Action Plan, HSRC, June 1999.

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