Brittany King

Justification of Capital Expenditure:
A Cost-Benefit Analysis to Understand Returns on Investments

Saint Joseph’s University

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Professor Heron

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It’s a tough world to spend someone’s money in. The beginning of the 21st century has provided challenges for America unbeknownst since the generation that endured the Great Depression. Regardless of the industry, money is a scarce resource. Money, value, and the company’s worth, is the ultimatum. Cash flow is of utmost importance for administrators at this confusing time in the country; alterations to this cash flow require a stringent level of justification, especially as the dollar amount of the alteration increases. This ruthless mentality clashes with the sensitivity that accompanies decisions made in the health care industry. Emotions run high when quality-of-care decisions are made and the wellbeing of consumers (patients) is at stake. When do companies (healthcare organizations) need to “bite the bullet” and spend their coveted cash?

It’s quite simple actually: any acquisition of capital, or a capital expenditure, needs to equate to a feasible and profitable Return on Investment for investors to consider it a worthwhile expense for a corporation. While this is not specific to the healthcare industry, it is particularly essential in keeping a healthcare organization competitive in such a multifaceted field. The complex nature of the healthcare industry is unique, and provides a predominantly difficult forum to conduct business and promote change. The simple concept of Return on Investment is manifested in a rather lengthy, yet thorough, justification of capital expenditure process.

Concurrent to the economic recession of the early 21st Century in America, the technological revolution is arguably at its height. It is undeniable that technology has transformed the healthcare industry. Imaging has changed the differential diagnosis process, laboratory testing has been expedited to lightning speed, insurance companies have smart-phone applications, and consumers are utilizing technology to educate themselves on management of their chronic illnesses. It should seem rhetoric then, to pose the following question: if Health
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Information Technology (HIT) can further this revolution through the implementation of Electronic Medical Records (EMR) why are they not found utilized by every Healthcare Organization (HCO) in America, regardless of the size or complexity of that organization? This question also has a rather simple answer as well: the technology is costly and requires justification for expenditure.

The factors involved in the justification of expenditure can be analyzed through a fictitious primary care medical office in a middle-class suburban neighborhood, approximately fifteen miles from the metropolitan city of Philadelphia in the Northeast section of the country. This primary care office has three full-time, staffed, Board-certified Internist physicians, a certified Physician Assistant, 6 registered nurses, and 8 medical assistants. The practice sees approximately 50 patients a day, and is open for typical operational business hours. The primary population that the practice serves is of working-middle class. The mean age of the patients is 53; the predominant third party payer is a private insurer, with Medicare also accepted. Typical diagnoses include acute illnesses (i.e. influenza, bacterial infections) and chronic medical conditions (i.e. diabetes, hypertension). With a recent increase in new patients, the medical office has offered a position to a recent graduate of an Internal Medicine Residency program who has just passed her Internal Medicine Boards. Upon interview, she raised an interesting question to the senior physicians on staff, “Which server hosts your EMR?” She was intrigued to learn that the office had not yet purchased an Electronic Medical Record. The senior physicians challenged her bafflement with her first non-clinical assignment: convince them to purchase EMR software.

First, an economically feasible, legitimate argument would need to be formulated to show logical need for the purchase of the EMR for the office. What makes this a worthwhile expenditure? A Return on Investment (ROI) is formally defined as “a calculation of the most
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tangible financial gains or benefits that can be expected from a project versus the costs for implementing the suggested program or solution.” (Economic 1) The first obstacle of this expenditure is the nature of the Return on Investment that a purchase such as an EMR would generate. If the purchase in question were a new MRI machine that insurance companies would reimburse the office at a higher rate for providing to the patients because of more sophisticated and cost-effective results, the ROI would be considered a “hard” investment. This tangible, quantitative, financial return would provide immediate profit and quickly reimburse the initial investment costs. However, when arguing for a purchase of a software system, after initial investment of a particular amount of cash (cash outflow), there is no immediate profit (cash inflow). This debacle is more commonly referred to as a “soft” ROI, or purchases that provide a qualitative benefit.

Typically, soft Returns on Investments pose a more challenging justification. Research has proven that such qualitative benefits of an EMR would be beneficial in the long run for a healthcare organization in terms of increasing efficiency, which can increase overall productivity and profit over time. Ashish Jha, MD, et. al, in the article “Use of Electronic Health Records in U.S. Hospitals,” published in the New England Journal of Medicine in 2009, argue “Health information technology, especially electronic health records, has the potential to improve the efficiency and effectiveness of health care providers.” (Jha 1629) The qualitative benefits of Health Information Technology (HIT) are categorized into criteria by Eric Poon, et. al, in “Assessing the level of healthcare information technology adoption in the United States: a snapshot,” published in BMC Medical Informatics and Decision Making in 2006. These criteria include: “electronic results review, computerized physician order entry (CPOE) including electronic prescribing, electronic health record (EHR), claims and eligibility checking, patient-doctor electronic
communication, and provider-to-provider communication. (Poon 2) This concrete evidence will strengthen the argument for EMR acquisition.

To justify an expense, the exact amount and scope of expenditure being considered must be reviewed. Dr. David Blumenthal argues in “Stimulating the Adoption of Health Information Technology,” published in *The New England Journal of Medicine* in 2009, “Experts estimate the cost of purchasing, installing, and implementing an electronic-records system in a medical office at about $40,000.” (Blumenthal 1478) This cost is extremely important in the financial analysis for this expenditure. However, first, the “Capital Decision Making Process” outlined by William O. Cleverly, et. al, in the text *Essentials of Healthcare Finance*, will be explored. Alternative resources and products should be considered, along with cost and benefit data. Prior performance information of the product should be reviewed if it is available. The overall risk of the product should be considered. Is this risk of this purchase high enough to create a detrimental return? Next, the cost of the product should be determined to be competitive and legitimate, and its solvency is considerable. With only a few feasible servers available for an EMR that is of proper scale for the small medical practice, the Capital Decision Making Process proves the appropriateness of this particular EMR. (Cleverly 426)

Once the product has proven favorable and feasible, it may undergo a detailed financial analysis. This can be done utilizing the Discounted Cash Flow (DCF) Method, which William O. Cleverly, et. al, describe:

A key aspect of the capital expenditure approval process is the financial or economical feasibility of the product. In most capital expenditure forms, there is some summary statistic that measures the project’s overall financial performance. In general, such measures are usually categorized as either discounted cash-flow (DCF) methods… (429)
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The essential components of the DCF method include a Net Present Value Analysis, a Profitability Index determination, and an Equivalent Annual Cost Calculation. These three values will determine the “financial or economical feasibility of the product.” (Cleverly 429)

First, the Net Present Value Analysis will be explored. Cleverly defines the NPV as “the difference between the initial amounts paid for the investment and the related future cash inflows after they have been adjusted (discounted) by the cost of the capital” (529). Simply, the NPV is an effective tool when there are multiple payment options for a product or multiple products to be purchased. For example, if the EMR Company provides an option to either purchase the EMR (valued at and sold for $40,000.00) for an initial investment of $32,000.00 with a 10% Discount Rate, the NPV can be calculated to be -$28,800.00. This was calculated as follows: Rate x initial investment (10% x $32,000.00) = $3,200.00, minus the initial investment ($3,200.00-$32,000.00) equaling our total, -$28,800.00. This can be compared to the second payment option presented by the EMR Company, which allows for $10,000.00 payments over 4 years with the same Discount Rate of 10%. This generates an NPV of -$36,000.00 using the same calculation. This NPV calculation showed the two options of financing alternatives presented by the EMR Company and proved it was financially solvent to purchase the EMR with a larger initial investment of $32,000.00 which generated a greater NPV (Cleverly 429). [Table 1, Appendix]

The second financial method to be utilized during the financial analysis portion of capital expenditure justification is the Profitability Index, which “attempts to compare rates of return.” (Cleverly 532) To calculate the Profitability Index, the NPV is divided by the investment costs. The Profitability Index is therefore calculated to be 0.90 (-$28,800.00 / $32,000.00). Cleverly notes that “Given no funding constraints, all projects with profitability indices greater than zero
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should be funded. However in most situations funding constraints do exist.” (431) Despite possible restraints in a practical setting, the PI value of 0.90 would support the purchase of this particular EMR software because it is a positive value. [Table 1, Appendix]

The third and final financial method being utilized in this analysis is the Equivalent Annual cost, defined as “the expected average cost, considering both capital and operating costs, over the life of the project.” (Cleverly 431) This method must consider the following equation: present value of the operating costs plus the present value of the investment, divided by the present value of the annuity. For this calculation, Cleverly et. al’s present value chart (page 406) was utilized. Let’s assume the $32,000.00 purchase of the EMR requires approximately $1,000.00 of maintenance costs for 10 years. The value from the present value chart to be included in the equation is found to be 6.1446. Therefore, the Present value of the operating cost was found to be (6.1446 x $1,000.00) $6,144.60. This value, added to the present value of the $32,000.00 (simply, $32,000.00) equaled $38,144.60. This value, divided again by the value from the chart (6.1446) gives us the Equivalent Annual Cost of $6,207.82. [Table 1, Appendix]

Now that the EMR software can be considered an economically feasible purchase, it can be projected that the Return on Investment for this purchase would be manifested by several distinct factors, including an increase in patients, due to greater patient satisfaction (less wait time, quicker response time for prescription refills, better provider-patient communication), and an overall net increase in profitability per provider. Since this medical office staffs three senior physicians, one younger physician, and one physician assistant, the purchase of the EMR would pay for itself essentially if each clinician showed a net benefit of more than $10,000.00 per fiscal year. According to a cost-benefit analysis conducted by Samuel Wang, MD, et. al, this is most likely the case for our fictitious medical office as it was in their article, “A Cost-Benefit Analysis
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of Electronic Medical Records in Primary Care,” published in 2003 in the *American Journal of Medicine* which showed a net benefit of $86,400.00 per provider over a five-year period following the purchase and implementation of an EMR. (Wang 398)

The capital acquisition justified above must be monitored to maintain its benefit for the medical office. It is arguably just as essential to track and supervise the progress of the program’s performance, as it is to justify its purchase. The young physician in the medical office will head a steering committee to track the successfulness of the implementation of the EMR. For the first three years of the EMR’s implementation, there will be quarterly meetings to track its efficacy. For the next 5 sub-sequential years, there will be semi-annual meetings. The committee will use internal features of the EMR, including usage statistics, physician error reports, and patient satisfaction surveys, to collect data and track its overall success rate.

Through the EMR system, contacting, tracking, and collecting data of patients with chronic illnesses can lead to wellness initiatives and the overall lowering of healthcare costs for providers. For instance, through filtering features in the EMR purchased by the medical office, a statistical report found that Diabetes Mellitus II was the diagnosis with the highest mode in the patient population. Patients were being prescribed medication 92% of the time for the condition, and insulin therapy was used in 47% of the patients. The medical office, from this data, concluded that its costs of operations could be decreased significantly if the number of patients being treated with insulin therapy could be lowered. This can be achieved by implementing a free diabetes education and nutritional support class at the medical office, once a week at night for a five-month pilot period. The class will increase health literacy of the chronic illness Diabetes and aim to decrease the need for insulin therapy through nutritional advocacy and family member education.
The Diabetes nutritional support class is merely one example of how an EMR system can increase efficiency and lower operational costs well after the initial investment has been paid. The net benefit per physician, as well as the possibilities to utilize the features of the EMR and translate them into cost-saving solutions for the medical office further supports the initial decision, through the above explained capital-decision making process and financial analysis, that a capital expenditure for an EMR is justifiable and economically feasible for this medical office. Although this particular immediate Return on Investment is a soft, qualitative one, the benefit, as illustrated above, will allow for more cash inflow in a multitude of facets and prove not only to be a justifiable expenditure, but an extremely successful one at that.
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Appendix

Table 1

<table>
<thead>
<tr>
<th>DCF Component</th>
<th>Equation</th>
<th>Calculation</th>
<th>Value</th>
<th>Implication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Present Value (NPV)</td>
<td>(Discount Rate x initial investment) – initial investment</td>
<td>Option 1: (.10 x $32,000) - $32,000 = $3,200-$32,000 = - $28,800.00</td>
<td>= - $28,800.00</td>
<td>The NPV of the total payment of $32,000.00 upfront payment is more financially sound than the four-year $10,000 payments at the same discount rate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Option 2: (.10 x $40,000) - $40,000 = $4,000-$40,000 = - $36,000.00</td>
<td>= - $36,000.00</td>
<td></td>
</tr>
<tr>
<td>Profitability Index (PI)</td>
<td>NPV / investment costs</td>
<td>(-$28,000) / $32,000 = = 0.90</td>
<td>= 0.90</td>
<td>Desirable for a profitability index to be greater than 0.</td>
</tr>
<tr>
<td>Equivalent Annual Cost</td>
<td>(PV operating costs + PV investment) / PV Annuity</td>
<td>PV operating costs (6.1446 x $1,000) = $6,144.60</td>
<td>= $6,207.82</td>
<td>Annually, the cost for this investment is equal to $6,207.82.</td>
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