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### Cost Benefit Analysis vs.Return to Investment

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Tom Jones is Director at TanJent Consultancy.

Taking decisions can be tough. Taking complex decisions is even tougher. Most eHealth decisions are probably at the tougher end of the complex. They can affect the performance of healthcare resources, impact patients, and are often linked to changes to clinical and working practices of highly trained, highly aware healthcare professionals. It can also take several years for eHealth to come to fruition, if it ever reaches this stage. In this setting, rigour in decision-taking is critical - so which techniques are helpful?

In business settings, return on investment (ROI) can be used to test the financial benefits of investment options. In services where some of the impacts on citizens can be intangible, cost benefit analysis (CBA) is often seen as more appropriate. A third approach is to use both - CBA + ROI.

ROI can be seen as an accounting model, and applied within the boundaries of the investing entity. It takes the cash generated by a proposed investment over time, and divides it by a value of the investment. This gives the ROI. The option with the best ROI is the one to pick. An obvious criticism of this approach for eHealth is that it omits the costs and benefits to patients, carers, healthcare providers and third-party payers.

CBA is an economic model, and enables the costs and benefits of all groups affected by the proposed investment over time to be valued and a benefit-to-cost ratio to be produced. The option with the best ratio is the one to pick. An obvious limitation of this approach is that the investing entity may not be able to afford the option with the best ratio.

One way to overcome these two limitations, and avoid the choice of CBA or ROI, is to use both. Unfortunately, this makes an already complex decision more complex.

#### Combining CBA and ROI for a More Informed Decision

The technicalities of using CBA + ROI are no more complicated than using just one of them. Much of the data is common. CBA includes tangible and intangible costs and benefits. For patients, these can include changes to

travel costs, waiting times and service quality and safety. For providers, they can include the cost of the eHealth investment, implementation, change management, improved risk management changes in productivity, costs and income. Where new services are created, they can include new types of income. For CBA, taxes such as VAT are excluded because they are transfer payments, and depreciation is excluded; the cash flow of the eHealth investment is used instead. For ROI, estimates of tangible income and expenditure changes are needed. Some of these can be copied from the CBA data, then unrecoverable VAT added and, where capital expenditure is needed, an adjustment

can be made to convert the capital outlay into annual depreciation and capital finance.

For an investment decision into the future, both CBA and ROI can use discounted cash flow to produce net present values. This reflects the time value of money, and is important for eHealth investment decisions. The European Commission's eHealth Impact( eHI) Study, available at [www.ehealth-impact.org](http://www.ehealth-impact.org), showed that the average time scale to reach a cumulative net benefit for its ten sites was about five years, with a maximum of about eight years. These timescales reinforce the need to use net present values, and so adjust estimates for the different time values of money created by the opportunity to earn interest with the money available.

Three other standard adjustments are needed to the estimated values used for eHealth investment options:

- Optimism bias, where people tend to overstate benefits and under state costs,
- Risk adjustment, to assess the impact of arrangements faltering, such as cost and time over runs, and
- Sensitivity analysis, to test the rigour of estimating; an essential feature of investment decisions.

All three should be used with CBA and ROI, and so can be used with the CBA + ROI model. The linkages are summarised in figure 1.

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There are several related techniques to CBA and ROI, such as cost-effectiveness analysis, internal rates of return and payback periods. If eHealth decision-takers prefer to use these, they can be accommodated into the linked model, because they have the similar data and technical overlaps.

### **Considering the Options**

The crunch comes when the linked CBA + ROI model produces data about options. This is when eHealth investment decisions become more complicated, and more realistic. Variables that have to be in place for an eHealth investment decision to have a chance of success must be identified. The eHI study shows the importance of the economic impact of eHealth on citizens, with an average of some 43% of benefits allocated to them. This shows the critical investment feature of eHealth: it is usually an investment where a significant proportion of the returns are for patients, and so is beyond the boundaries of healthcare providers.

This is consistent with other investment decisions in healthcare, such as new drugs and new medical and surgical techniques. It shows the value of CBA and the limitations of using ROI alone, which excludes a significant eHealth impact. This points to the limited strategic fit of ROI in eHealth investment decisions.

Conversely, CBA does not deal with the impact on the income, expenditure and balance sheet of the eHealth investor, often a healthcare provider, and so does not deal with affordability – another critical investment theme. The eHI study also reveals the need to increase expenditure for an eHealth investment to succeed. It can include extra resources needed for outsourced ICT services from suppliers, ICT maintenance, internal ICT teams, project management, change management, training, ICT obsolescence and a continuing investment in an eHealth dynamic. Using ROI can combine

these to identify the best, and most affordable, return, and so help to focus on avoiding, or minimising, financial risk, or disaster, from eHealth investments.

One of the outputs from this analysis is often the affordability gap. Additional costs of an eHealth investment may not always be met in full by additional income streams, and so create an affordability gap. This leads to the search for other sources of finance, including reducing costs, liberating cash from improvements in productivity and realigning the entity's overall investment plan to redeploy additional finance from other projects to the eHealth project. These are very tough decisions, often needing medium-term solutions. Ignoring them will only defer the problem, so they must be linked to a CBA perspective.

Often in eHealth investment decisions, CBA models show preferred options which have a good strategic fit, but are different to the options identified by ROI; this is where eHealth decision-takers add value. An optimal match has to be found. The steps are summarised in Figure 2.

### **Making it All Add Up**

Squaring circles has to be achieved. At its simplest, investing in eHealth and failing to achieve strategic goals is not a good idea. An unaffordable eHealth investment with an unacceptable ROI is not a good idea either. The goal for eHealth decision-takers is to keep all the themes linked and to iterate, test and find the scope for an optimal fit. The CBA or ROI choice is not relevant in this setting. Finding an eHealth investment that meets strategic goals over time, will be economically successful, is affordable, and can contribute to the future eHealth dynamic of the organisation is the preferred outcome.

Another important feature of CBA + ROI is the scope to include the resources and steps needed to realise the benefits. CBA and ROI can be used to identify preferred options for eHealth investment. On its own, this is limited. The CBA + ROI options must include the resources, activities and timing needed to realise the benefits. Another feature of the eHI study is that benefits from eHealth are not always realised just by using the eHealth application. Other factors have to change too, often clinical and working practices. In these cases, these changes have to be managed over realistic timescales.

Using CBA + ROI offers a more balanced diet for eHealth decision-takers, and avoids indigestion from overindulgence in a single theme. It also avoids overemphasising the techniques over the decisions.

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