Using Return on Investment and Resiliency Return on Investment for Preparedness

Abstract

Return on investment (ROI) has long been accepted as a primary tool for decision making for capital investments and even choices among competing operational budget lines. Applying ROI to investments intended to prevent or mitigate future risks and hazards can be very difficult as benefits are typically arduous to define and calculate while risk probabilities can be very small. This paper uses examples from recent research concerning law enforcement and airport resiliency to illustrate the feasibility of computing ROI and resiliency ROI (RROI) for such investments.

Evidence for Practice

This paper gives examples of computing the hard and soft benefits of investments in resiliency taken from recent research into law enforcement and airports. It makes the case that the difficult process of quantifying soft benefits is worthwhile as ROI remains a key factor in senior management and governing body decisions on investment.

Introduction

Return on investment (ROI) has long been accepted as a primary tool for decision making for capital investments and even choices among competing operational budget lines. More recently resiliency return on investment (RROI) has been introduced for the special case of investments in redundancy and other measures to enhance resiliency of facilities and activities (Hall et al., 2017).

ROI is defined as the total benefits (in dollars) of an investment divided by the total cost of that investment (Phillips and Phillips, 2009). In most cases ROI is computed for a fixed number of years, typically the expected useful life of the capital project. For non-capital projects, an arbitrary time span is usually set. The length of such an arbitrary time span depends on the nature of the industry, and recently, more often on the rate of technological transformation affecting that industry.

RROI is no different than ROI except it is applied to investments to improve the resiliency of a facility or the operations of an organization and resiliency may be durable for longer than other projects and benefits could last over a longer time frame. The definition of resiliency has several dimensions. The classic definition of being able to absorb a disruption and bounce back to normal certainly applies, but it has different implications when looked at short term as in a natural disaster, accident, or criminal action compared to looking at a long-term trend in technology, change in business model, or nature of threat. RROI can be computed in each of these cases but with vastly different degrees of difficulty depending on the time frame and the uncertainties of longer term trends.

One difficulty in applying ROI and RROI is the paucity of peer-reviewed papers in the field. Much of the literature exists as corporate white papers, sales pitches, conference presentations,

and similar gray literature. This paper seeks to bring the significant ideas from some of that literature together in a useful and citable form.

This paper will focus on the extreme difficulties of applying ROI and RROI to things like law enforcement, emergency preparedness, and resiliency because they are states of being and often not so tangible or easily measurable. Examples from law enforcement and from airport emergency management will be used to illustrate the methods and challenges of developing meaningful ROI and RROI measures. The paper will also emphasize the key importance of clear communication and how using ROI and RROI can foster or obscure it.

Why Resiliency Matters

The main reason that resiliency matters is that we now live in an environment where disruptions are the normal state. Any non-resilient program or structure is prone to sudden or gradual failure if its leadership has not invested in resiliency measures. The disruptions may be relatively sudden like an earthquake, tornado, industrial accident, fire, ransomware attack, or terrorist incident or they may be slow such as changes in technology, markets, or business models.

When lack of resiliency is viewed in terms of opportunity cost, where opportunity cost represents the benefits forgone by choosing one option over another (Sharkey, 2022), then non-readiness for a pandemic, a plane crash, a ransomware attack, or whatever could be negatively measured in millions of dollars, many lives, and diminishment of public confidence. Often the argument becomes about "black swans" (Taleb, 2007) where the old dilemma of not paying attention to risks that are so unlikely justifies not trying to measure "contingent ROI." When the probability is really difficult to measure conventionally and the derived "cost" is so extreme, all evaluation of ROI is hard, but still worthwhile.

Applying ROI to Law Enforcement

Applying new technologies to law enforcement provides the best picture of the challenges and benefits of computing ROI. The usual sales pitch for new technology for law enforcement is that it will increase productivity or decrease staffing needs, or both. A more subtle argument would be that technology can increase security and safety. A simple computation of ROI would typically take the total money saved on salaries, benefits, and equipment and divide it by the cost of procuring the new technology; in other words, dividing the hard benefits by the costs to get ROI (Gascón and Foglesong, 2010). As traditionally applied in the private for-profit sector, "hard" ROI is defined as the ratio of money gained (profit) or lost, relative to the amount invested (total cost) (Tarantino, n.d.). However, in non-profit organizations such as government and perhaps especially in public safety functions such as law enforcement, looking only at hard benefits may exclude soft benefits that exceed or even greatly exceed the hard benefits (L-tron, n.d. Nevertheless, Tarantino notes that "hard" ROI measures are great tools and can serve as a quantifiable backdrop to the other, "softer" measures that we will examine next. Tarantino also notes that "hard" ROI sometimes fails and has unintended consequences. An example of this occurs when ROI is used to justify a reduction of personnel, which can impact law enforcement

operations, creating staffing challenges and loss of public confidence that often outweigh cost savings.

What are hard benefits and what are soft benefits? Hard benefits are things that are easy to cost. Examples are savings with identifiable costs such as reduction in force or decreased operating costs of equipment. Soft benefits usually fall in the realms of political, social, ideological, strategic, and community stewardship benefits (Tarantino, n.d.

Tarantino (n.d.) sorts soft benefits to consider for law enforcement into three categories: stewardship, time, and personnel. Sample soft benefits that he cites include improved ability to perform mission-critical functions and meet public safety objectives; reduced errors, rework, and duplication of effort; increased job satisfaction; and reduced administrative burden on staff. In addition, increased retention and enhanced recruitment are soft benefits (QuinnWilliams, in press).

The main problem with soft benefits is how to calculate their dollar value. Tarantino argues that they can be broken down into measurable components such as overtime costs, training costs, recruiting costs, etc. This analysis is both time-consuming and intellectually challenging, but when done, it shows the "hard" roots of the "soft" components of ROI, thereby allowing a more complete picture of the true benefits for a given investment in law enforcement.

Let's look at applying ROI to a major area of innovation in law enforcement: the use of cameras including CCTV area surveillance, dashboard cameras, body cameras, traffic cameras, and the many types of integrative software that allow such things as facial recognition, license plate reading, tracking of individuals, and perimeter security, to name just four applications of modern camera systems. The traditional ROI argument would be that the increased areal and temporal coverage allowed by such systems as compared to patrolling police would generate significant cost savings primarily through a reduction in the number of patrol police needed along with their equipment. However, the camera systems detect more incidents that require a human to investigate, which may actually increase the number of officers required. Where camera systems do generate a time savings is on the investigatory end of incidents. An example of a soft benefit of the use of cameras in law enforcement is greater transparency.

Applying ROI to Airport Emergency Preparedness and Resiliency

Airport emergency preparedness and resiliency include many types of activities: for example, staffing, training, drilling, exercises, facility design, facility construction techniques, redundancies, and back-up power (Hanson Professional Services, in progress) and communications systems. These factors all add cost above the bare minima for creating an airport that can function under normal conditions, so ROI and RROI come into play for justifying the additional costs to achieve preparedness and resiliency.

Let's examine three types of resiliency activities and how ROI and RROI apply to them: (1) the personnel issues around staffing, training, drilling, and exercising, (2) operational redundancy, and (3) facility hardening and redundancy.

Personnel Issues Involved in Airport Resiliency

Over the past 20 years a gradual trend has emerged for airports to add professional emergency managers to their staffs. Part of this was a response to 9/11 and to the major hurricanes of 2004 and 2005, and part of this was a response to increasing pressure from the FAA to improve airport emergency planning (FAA, 2009). This trend has run in parallel with the development of emergency management as a professional field. As a result, the number of U. S. airports with full-time emergency managers has grown from about five in 2004 to more than 110 in 2022. This is out of approximately 550 U.S. airports that have commercial service. In addition, many of the larger general aviation airports have emergency managers, either full-time or as a collateral duty.

In parallel with the trend to add emergency managers to airports' staffs has been a trend to add training and exercise specialists. Often the emergency manager serves both roles. Training is focused on both emergency response roles and on airport security. Typically, training occurs during employee onboarding and then at various times during the year. Training and drills tend to be synched to the FAA's requirements for annual and triennial emergency exercises and TSA's requirement for an annual aviation security exercise. Some airports do far more training and exercises than these minima (Smith, Garcia, Sawyer and Kenville, 2016).

It is easy to cost out adding positions for emergency management and training, and the costs of doing training and exercises are relatively small, with the major cost issue associated with training and exercises being time away from other activities of airport employees and those of other stakeholders. The hard benefits of these expenditures are more difficult. How much is being able to check the box for required exercises worth? How much is having zero discrepancies on inspections worth? In most cases the soft benefits greatly outweigh the hard benefits. What is a preparedness culture worth at an airport if a very rare event like an active shooter, plane crash, or pandemic happens? What other soft benefits accrue to an active training and exercise program? Bersin, looking at highly successful for-profit corporations, found that the more active a firm's "learning and development" program for resiliency is, the greater are the firm's profits, growth, employee retention, and internal capabilities (Bersin, 2010). Usual measures of ROI don't capture these greater benefits. Airports can logically be expected to gain similar soft benefits except rather than greater profits, airports would free up funds for other programs.

Operational Redundancy

A straightforward example of operational resiliency is the provision of back-up electrical power. Severe weather events and regional electrical grid failures have shown airports that they need to have on-site capabilities for generating electricity. These needs come in several levels: the minimum to run airfield lighting, avionics, and air traffic control in order to support aircraft operations; the minimum for life safety; the minimum to evacuate a terminal; the minimum to operate the entire airport. The cost of back-up power escalates greatly across these four tiers, but the ROI and RROI computations are similar. Procurement, installation, maintenance, training to operate, and fuel storage are easy to cost out. Depending on which tier is being examined for ROI, the costs of an airport being shut down are also relatively easy to calculate. Here the hard benefit is how much cost is avoided by keeping the airport operational or by minimizing the time it is shut down.

The soft benefits of back-up power mostly accrue in the stewardship dimension. The airport benefits in terms of its reputation and brand. Perhaps the greatest benefit of airport resiliency is its ability to stay in operation or return to operation quickly so as to be able to be a major asset in local or regional disaster response and recovery (Smith, Kenville and Sawyer, 2015).

Facility Hardening

Designing and building airport facilities to be resilient increases their cost, sometimes significantly. The most economical approach is to design resilient features into new construction whereas retrofitting existing buildings is more costly, difficult, and disruptive of ongoing operations. An example of this is the hardening of Memphis International Airport against damage from a potential major earthquake from the New Madrid Fault (Thomas Wallace, interview, July 28, 2022). The airport has been carrying out a multi-year program of seismic upgrades of runways, taxiways, bridges, the terminal, and new construction of a concourse. Resiliency is particularly important at Memphis' airport because of its central role in logistical supply chains nationally and worldwide and its potential role in post-earthquake disaster response and recovery of its region when most of the highway and rail infrastructure may be destroyed or severely damaged. Taking into account the direct and indirect benefits of the airport in this role is challenging but not impossible if each of the dimensions in Tarantino's (n.d.) model is broken down into functional components and costed individually.

Advantages and Disadvantages of Using ROI and RROI

The main advantage of computing ROI and RROI for resiliency is to make a case for investment in terms that senior management understands and can use to compare different programs demanding funding. ROI is as near to being a universally accepted decision-making tool as there is. Perhaps the main advantage of using the RROI concept is to emphasize inclusion of "soft" benefits and perhaps also longer term costs and benefits.

The main disadvantage for computing ROI and RROI for resiliency investments is how time-consuming and intellectually demanding it is to capture the hard benefit subcomponents of soft benefits. Using these types of ROI measures may require an adjustment of worldview or culture on the part of decision-makers. Fortunately, a culture of resiliency as well as of sustainability seems to be emerging as a new generation of leaders takes over.

Conclusions

It is tempting to argue that ROI/RROI is immaterial to investment decisions given that the price of most resiliency measures is small or even tiny compared to the costs of non-resiliency when something happens. Although this argument is most obvious when applied to very rare events with huge consequences—the black swans—it pertains to all investments in resiliency, preparedness, and prevention. The United Nations Disaster Programme estimates "that for every dollar spent reducing disaster risk, seven dollars will be saved from economic losses associated with cleanup and recovery" (UNDP, 2016). ROI and RROI are worth computing although the effort to include all soft benefits and actual costs can be onerous and time consuming.

Normal budgeting processes, whether for capital or operating expenditures, usually involve competition among various programs. Senior management will typically use ROI as a deciding factor, perhaps even the most determinant factor, in making funding decisions. For this reason, entities seeking to improve their resiliency must be prepared to do the work to compute ROI and RROI.

Investments in resiliency are hard to justify because they are bets on a future that decrease the odds of seeing a return. In other words, the greater the investment in resiliency, the less likely resiliency will be needed and the harder it becomes to justify it was necessary in the first place. If "there is no glory in prevention" then RROI calculations only make sense for measures reducing (mitigating) but not preventing the impact of an event. It's a disconcerting thought that resiliency actions may have to plan for some damage to occur so that the investment can be better evaluated and justified in hindsight (Daniel Link, email.

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