



WHAT WORKS - A ESSAY FROM THE PKAL COMMUNITY

THE “REAL OPTIONS” APPROACH TO CAPITAL DECISIONS: PLANNING FOR CHANGE

Institutions with experience in information technology (IT) planning know that the one constant is change. Rapid advances in technology create high uncertainty about the future, and constant change means that strategies may be obsolete before they are fully implemented. At the same time, given the capital intensity of IT, strategy matters. Because funds are limited while needs seem limitless, institutions must find ways to make choices. In the world of IT planning, tools and ideas have emerged to help university leaders deal with these situations and can be applied usefully to broader university planning needs, particularly as capital planning becomes more and more like IT planning.

Rapid innovations in educational curricula and delivery methods, along with changes in technology mean that capital planning is now characterized by greater uncertainty and complexity than ever before. University planners want to create spaces that support new methods of teaching and learning. However, such methods are constantly evolving. Facilities that fit with today's trends may be obsolete tomorrow.

Traditional planning relied on a degree of relative certainty about the future as the basis for long-term mapping as to where the institution would invest its funds, what types of spaces it would create and how these would fit with the overall institutional mission. In the face of greater complexity and rapid change, these methods of planning may no longer apply. Plans that made sense a few years ago may no longer be relevant by the time they are to be implemented.

At the same time, long-term capital plans continue to be as important as ever. Universities require long-term plans to secure support from donors and Board members, who need to feel that they are investing in an institution that is looking ahead. Moreover, without long-term plans in some form, institutions run the risks of scattered decision-making, too focused on short-term needs.

To address these issues, the “real options portfolio approach,” which comes from the world of finance and has been helpful in decisions about IT, offers an innovative strategy that can be usefully applied to other types of university capital planning.

What are “real options”?

This approach applies the ideas behind stock options to other types of investment decisions. These might involve investments in capital projects, information technology, personnel, operations or other “real” choices facing the institution. In the stock market, buying an option gives an investor the right, but not the obligation, to buy or sell shares at a later time. When investors buy options, they are spending a little now to preserve flexibility for the future. Options provide a way of managing risk by enabling investors to put off decisions about whether or not to invest (or divest) until later when there is more certainty.

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Similarly, real options are small, partial investments that one can make now in some non-financial investment (e.g., equipment, personnel, a new process) in order to create the possibility (but not the obligation) of a full-fledged investment at a later time. Real options are a way for investors to buy time, during which they can learn more, so that they can make a full-fledged investment decision later, when there may be more information and more certainty.

The thinking behind the real options approach suggests that institutions need to find ways to minimize investments in the face of uncertainty. With limited resources, institutions want to avoid spending on fixed assets, fixed costs and start-up expenses until more is known about the potential pay-offs of a given project.

However, this doesn't mean that universities can simply wait for uncertainty to go away. Instead planners can look for small bets (real options) that will help explore a project, show what it will take to make it successful and demonstrate its potential. Without these small bets, an institution may be ill prepared to decide about an investment later.

For some, the concepts behind the real options approach are intuitive. For example, when remodeling a building, a university planner might choose to install fiber-optic cable even though the institution has no specific plans to use fiber optics now. This investment represents a real option.

By investing a little now in the cost of the cabling, the university preserves the option of using it later without having to either make the full investment now, or bear the cost of a retrofit later on. This decision gives the institution some time to test assumptions, see which technologies emerge, gather information and learn.

Later, if a fiber-optic based system seems sensible, the institution can move ahead with it without costly retrofit wiring. Alternatively, if a different technology turns out to be more effective, the institution can disregard the relatively small investment it made in the cabling.

A portfolio of options

The implications of the real options approach are relatively straightforward when looking at a single project. However, this strategy is even more powerful when the notion of a “portfolio of options” is introduced, which provides a way of thinking about decisions across multiple investment choices at once.

When considering more than one project, an institution is faced with questions about how to make trade-offs among the various choices in the face of different kinds of uncertainty. How can the institution limit the downside risk of its decisions and still capture the upside potential represented by the different choices?

One way to think of these choices is by arraying them into an “Opportunity Portfolio,” as suggested by Rita Gunther McGrath and Ian MacMillan in their book, *Entrepreneurial Mindset*. The Opportunity Portfolio provides a way of thinking about different investments based on their uncertainty profiles.

By distinguishing projects based on the types of uncertainty that they carry, an institution can make conscious choices about how much it wants to invest in the face of different types of uncertainty. Clearly, larger investments will be warranted where uncertainty is lowest. However, institutions must also find ways to place small bets in those areas where there is greater uncertainty.

These relatively small investments are the real options that support learning and preserve flexibility. By thinking in terms of a “portfolio” of investments and options in its capital projects (as it likely does with its financial investments), an institution can ensure that it is carrying the right mix of projects— some that are relatively certain, straightforward investments and others that represent options or bets for the future.



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Uncertainty profiles: “Can we do it?” and “Will they want it?”

For any given investment, its uncertainty profile includes two dimensions: the degree of capability uncertainty and the degree of market uncertainty. Capability uncertainty is the institution’s assessment of how much confidence it has that it can take advantage of a given investment. To evaluate the level of capability uncertainty for a given project, planners might ask themselves the following questions:

- ◆ How confident are we that we can take advantage of this opportunity?
- ◆ To what extent does this project draw on our existing strengths and abilities?
- ◆ To what extent will the institution have to change or learn new ways of working in order to take advantage of this investment?
- ◆ How easy or difficult is this likely to be?

Projects that take the institution into relatively new territory, particularly if those changes are likely to be difficult, have a higher degree of capability uncertainty than projects that build more directly on existing strengths.

Market uncertainty is the institution’s assessment of whether there will be an audience or a demand for the results of a given project. To ascertain the degree of market uncertainty for a given project, planners might consider the following questions:

- ◆ If we build it, will they come?
- ◆ Will the faculty, students, staff or alumni who might benefit from this project be interested in its results?
- ◆ How confident are we that this project will meet the users’ needs in a way that interests them?
- ◆ What will it take for us to build support for and interest in this project among those who might benefit? Will this be relatively easy or difficult to do?

Where the demand for a given project is obvious, market uncertainty is relatively low. On the other hand, in situations where a new building feature, program offering or technology is relatively untested, market uncertainty is higher.

Opportunity portfolio

Once the levels of capability and market uncertainty have been assessed for each project, several projects can be arrayed into an Opportunity Portfolio. The Opportunity Portfolio is a matrix showing Capability Uncertainty along the left and Market Uncertainty across the bottom. Projects that are most certain will be near the lower left area of the matrix, while those that are most uncertain will be nearer the upper right.

Arraying projects into the portfolio matrix helps an institution compare apples to apples and oranges to oranges. By categorizing projects with similar uncertainty profiles together, an institution can compare projects with those that are similar, and at the same time distinguish projects that are different. In standard planning, more certain investments nearly always win out over riskier ones.

However, an institution that wants to ensure its preparedness for the future might set investment targets for different parts of the portfolio matrix, putting aside funds that are ear-marked for riskier, more uncertain types of projects.

Small bets made “on the fringes” can help an institution test its abilities, test the market and learn in ways that help prepare for future choices. Without some foray into these uncertain waters, a university may find itself ill prepared to make future decisions as they come along.

Types of Investments in the Portfolio

The Opportunity Portfolio is divided into five zones. Two of these, Enhancement and Platform Launches, represent standard investments. The other three, Positioning Options, Scouting Options and Stepping Stones, represent areas where real options might be worth trying. Below we describe the types of investments that might be made in each zone:



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Standard Investment Zones

- ◆ **Enhancement launches:** Improvements to existing products or offerings.. Examples might include changes to the reading list or lab assignments for a given course, additional sections of an existing and popular class, the expansion of a library computer lab in a popular study area, or the addition of a self-serve sandwich bar in an existing cafeteria.
- ◆ **Platform launches:** Expansions into related markets. Platform launches might include the addition of a new course in an existing department, renovation and expansion of existing dorm space, or the opening of a branch of the university food service in a new location.

Real options zones

- ◆ **Positioning options:** “We know there is a market, but we’re not sure what it takes to deliver, or whether we can deliver.” When an institution is relatively certain that there will be interest in a new product, service or offering, but is unsure about its own capability to deliver to that market, it may make sense to test the waters by investing in a Positioning Option. Positioning options provide an opportunity to begin developing a capability— or at least to begin to learn what it would take to do so.

For example, because many students in two academic departments double-major in their fields, the departments may want to consider creating an interdisciplinary major that would officially bring the two areas of study together. Rather than launching a full-scale, new major, they might begin by creating one or two jointly-taught courses to learn more about how to bring their fields together in a meaningful way.

In another example, consider a university that is interested in implementing wireless computer access. The popularity of wireless is clear from the number of coffee shops and public spaces that are making use of the technology, but campus leaders are concerned about how to implement the technology without jeopardizing network safety. A positioning option might involve testing wireless in one dormitory to work out the kinks and explore potential security concerns before launching a campus-wide wireless network.

- ◆ **Scouting options:** “We have— or can get— the capability, but want to learn more about the market.” Scouting options represent small forays to see whether there is interest or demand. For example, in order to test whether students would make use of small group workrooms in a new building, a university might set up temporary partitions in an existing space and outfit these “rooms” with existing furniture.

Careful monitoring of these temporary spaces would offer some indication about whether it would be worth creating similar workrooms in the new building.

- ◆ **Stepping stones:** “The market is uncertain, as is our ability to serve it.” When there is uncertainty about both the institution’s capability and the market, Stepping Stone options may be worth pursuing. Because these represent the area of most uncertainty, investments in Stepping Stones should be quite small. The caveat: fail cheaply and often.

In other words, institutions that want to be prepared for the future will be on the lookout for ways to experiment with ideas “on the fringes,” but will do so in a way that keeps costs at a minimum. For example, as a result of the successful Human Genome Project, genomics will have a major impact on health care and other industries.

However, it is too early to know how the specifics will impact the marketplace. In order to feel their way into the future, many institutions are making small investments to familiarize themselves with the field and to begin to understand how genomics fits with their other endeavors. Those universities that are not able to move quickly when the time is right, will lose the opportunity to take advantage of advances in the field.



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Real options in the real world: Examples from university planning

Several academic institutions have successfully taken a real options approach in several areas of planning. Tufts University adapted the approach for IT in creating its digital library and applied the approach to curriculum planning in developing its distance learning program. Whereas, Cornell University and Dartmouth College applied the real options strategy to capital planning.

Tufts University digital library: A positioning option

With more and more scholarly materials being produced in digital form, and students and faculty members eager to have access to resources digitally, IT leaders at Tufts were fairly certain that the market would exist for a digital library repository. But the University was less certain about what it would take to make the project happen.

Software for such a digital library repository was not yet available that would be robust enough for a library's needs. Knowing that it wanted to learn more in this arena, Tufts chose a “Positioning Option.”

Rather than making a large investment itself, the University joined a consortium with Cornell University and the University of Virginia to develop the software. This group started with a prototype, testing the viability of an experimental version of the software.. The prototype included just a few collections. Over time, new collections were added through funding received via grants and contracts.

By investing in the option of joining the consortium and contributing to the development of the digital library, Tufts was able to not only reduce its capability uncertainty (by showing through pilot test that it could be done) but also was able to attract funds to expand the project.

With this experience under their belts, Tufts and its partners are now entering the second phase of project development, which will include developing a more robust version of the software and creating the Digital Collections and Archives Office to manage the growing effort.

Despite its own investments, Tufts hasn't given up on the possibility of commercial software that might someday make its consortium-grown version obsolete. Having invested in this option early, however, the university has learned what it needs and will have a better idea about what to look for as new products become available.

Distance learning at Tufts University Fletcher School: A scouting option

Another example of an option investment at Tufts took place in the Fletcher School of Law and Diplomacy, renowned for its program in international studies and diplomacy. Officials were interested in building on faculty and curricular strength by creating a distance education program that would make a Fletcher degree possible for people around the world who were unable or uninterested in a two-year, full-time program in Massachusetts. School leaders were clear that such a program needed to fit with Fletcher's high standards and not water down its strong academic program.

Despite these concerns, proponents were relatively certain that Fletcher could deliver a high quality curriculum to this market. Their question was, “If we build it, will any one come?” No other schools were yet offering degree-oriented, distance learning programs in international studies, and it wasn't clear that potential students would be interested in learning in this way. So the University bought an option, investing in a pilot program to learn about developing and marketing high quality, distance learning programs.



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Real options in capital planning—Facilities at Cornell University and Dartmouth College

Similarly, real options thinking can be useful in capital planning. For example, during the process of building a new library at Cornell University, the architects and planners wanted to test a few ideas that could be incorporated into the new library. Some felt that a café might be popular among students.

Rather than incorporating the café into the plans and waiting until the building was complete to test the concept, the planners turned the periodicals area of their existing library into a temporary café by bringing in a food cart. This low-cost positioning option helped the planners learn what it would take to have a café in the new library.

At Dartmouth College, students and faculty on the planning committee were interested in having the new library environment integrate computing and library resources, but there was some concern about whether faculty members would make use of this new type of resource.

During the planning phases, the group created a Faculty Development Center, where faculty could try out the new technologies and learn about how to incorporate them into their classes. This scouting option investment helped Dartmouth test both faculty interest (Is there a market?) and capability (Can we do it?).

At the same time that the library planning was underway, another group on campus was studying the possibility of wireless technology for the campus. Sadly, this group did not share their interest in testing wireless capabilities with the library planning group, so the library was built without the infrastructure for this new capability.

Too often, planning groups on campuses are reluctant to talk outside their group about the uncertainties they face. Even when they do experiment with new ideas, often these experiments remain hidden from view, in case they fail. A real options approach, on the other hand, encourages experimentation and frequent (though inexpensive) failure as a way of testing new ideas.

The real options portfolio model and related ideas can help create a shared language for talking about risk and experimentation, which can lead to improved communications and integration of efforts for capital, IT and academic planning.

Caveats for Careful Investing

Just as with financial investments, managing a real options portfolio takes some time and attention. The following tips and caveats help to make the most of real options investments:

- ◆ **Make sure the option enables the institution to make a longer-term investment than it might make otherwise.** In the financial world, investors need to know that they might want to buy or sell a stock before they bother to invest in an option on it.

For real options, this means making sure that there is some interest in the longer-term investment that would follow the option investment. Ultimately the point of investing in a real option is so that the institution can learn more about an idea, to uncover what it would take to pursue it and whether there will be enough interest to make the larger investment worthwhile. When choosing among a set of real options for the portfolio, select the ones that provide the necessary learning.

- ◆ **Harvest the learning.** Just as a financial investor wouldn't buy a stock option and then ignore the price of the underlying stock, those investing in real options need to find ways to nurture and monitor the experiments they've started. It can be too easy for institutions to set up pilot projects and then move on to the next big project. Part of the pilot test design should include ways of tracking the results and capturing learning.
- ◆ **Options aren't always the way to go.** Sometimes a straightforward investment can be more cost-efficient than investing in an option. When there is not likely to be any new information available that will affect a decision, an institution may be better off making a straightforward bet, rather than hedging through a smaller option investment. For example, when planning a building, there is little value in delaying the planning of lighting and electricity since these technologies are not likely to change. ▶

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Similarly, options are not so important when trends are relatively predictable. For example, IT server hardware has been consistently growing cheaper per storage volume. In that environment, it probably doesn't make sense to spend more for upgradeable servers (to buy an option for upgrading later), since a few years from now cheaper, smaller, more efficient servers will be available to replace them all together.

Planning for the Future

Investing in real options is a way to preserve flexibility for the future. Options enable learning so that an academic institution can act more quickly later. They provide a way to build capacity now for opportunities that may emerge (or may be bigger) in the future. A philosophy of investing in options is one that embraces trial and error. Frequent, but small failures provide ways to test assumptions, try out new ideas and build learning quickly.

Without these types of investments, a university is unlikely to be prepared for the future, unable to take action quickly when the time comes. Structuring opportunities into a “portfolio” means that projects only have to compete with other projects that have similar risk profiles, which is a way to ensure that some investments are being made on the fringes.

When planning groups across campus taking a real options portfolio approach, they may feel more comfortable in sharing their experiments and uncertainties with one another in a way that enhances learning and supports better coordination among plans.

By collaborating in a university-wide planning effort, they are helping to ensure that the institution remains sound in its investments while navigating future change. ■

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