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There are many apt metaphors — from “The search for the Holy Grail” to the “Hunting of the Snark” — to describe how research administrators are dealing with Electronic Research Administration (ERA). According to the Chronicle of Higher Education (Florence Olsen, May 11, 2000), universities across the country are struggling to install complex administrative-computing systems, and thus far, few of these have been successful. Research administrators who had hoped that these systems would solve a variety of problems related to pre-award and grant and contract administration are beginning to realize that marketing promises do not always translate into reality.

The wisdom on the street is that it is not a good idea to be a leader in ERA. Yet, if no one is willing to accept the time demands, the expense, and the inherent frustration involved in developing a workable ERA solution, there will be little progress.

The Journal of Research Administration is therefore pleased to publish three articles by individuals who are willing and able to take the lead in ERA. Follow Bob Killoren, Ken Forstmeier and Raymond Eyerly as they take you down the “long road” The Pennsylvania State University has traveled to overcome campus politics and build a successful ERA system. Learn how Lisa Balance and Herb Cherm-side engineered a plan of action for ERA at Virginia Commonwealth University. Discover the importance of the human dimension in implementing ERA as described by Pam Krauser at Notre Dame.

ERA has brought many changes to the field of research administration and will undoubtedly bring more. However, ERA is not the only change agent we face as research administrators. In this issue, Robert Stoddard describes how many of us in the health science community have responded to the changes introduced by the NIH Modular Grants Initiative (MGI) just over a year ago. For some research administrators, the MGI has provoked a paradigm shift, while for others in research administration, modular grants remain a puzzle.

Every research administrator must learn to adapt quickly to change, especially when dealing with neophyte proposal writers. In this issue of ShopTalk, Jenny Tomkins and Pamela Brown describe a typical TGIF day in research administration. Finally, a feature article by Yves Fassin explores the relatively new role universities are beginning to play in economic development and how university-industry liaison offices facilitate this process by adding value to technological innovation and transfer.

Happy summer reading!
Contributors

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Robert Stoddard ("Modular Grants: From Puzzle to Paradigm") is Assistant Executive Administrator for the Department of Molecular and Medical Pharmacology and five other campus units in the UCLA School of Medicine. This is one of the largest research operations at UCLA, with revenue in FY99 of $52M. One of his responsibilities is the organization’s pre-award office, which is a proposal processing center for 74 faculty members. Some of the computerized programs he helped develop for grant preparation and data management have been used extensively by other universities across the country. Robert also helped design the NIH templates that were released electronically as part of the ERA initiative a few years ago. Robert has a B.A. from Brigham Young University and an MFA from the University of Utah.

Jenny Tomkins ("It’s not always ‘TGIF’ in Sponsored Projects") has worked in academic research administration since 1996, assisting faculty and staff at Northern Illinois University to prepare proposals for submission. Before that she worked “on the opposite side of the fence” as a grantwriter and fundraiser for a number of not-for-profit organizations. Born in the UK, she has worked in both England and South Africa for Oxford University Press as an editor and publicist.
The Long and Winding Road: The Politics of Building an ERA System

Raymond W. Eyerly, PhD
Kenneth G. Forstmeier
Robert Killoren, CRA

Abstract
This paper presents a case study of the development of a comprehensive ERA system at The Pennsylvania State University (Penn State). Authors examine the external barriers and internal political pressures that can affect the implementation of ERA on a university campus. This case study demonstrates the importance of involving all stakeholders in the planning, development and implementation of ERA; the necessity of paying attention to the needs, the fears, the egos and the turf concerns of all constituents and partners; and the reality that change can be a unpredictable and circuitous process.

Introduction
Many research administrators have found the road to Electronic Research Administration (ERA) to be long and winding — and often quite grueling. Before attempting to establish an ERA program at your institution, you must be certain that you are personally convinced of its value, otherwise you will not have fortitude to stay the course. For one thing, you will be heading into virtually uncharted territory, and you may have to construct your own map to reach your (as yet) unknown destination.

The Pennsylvania State University (Penn State) began to seriously pursue the implementation of a comprehensive ERA system in 1994. However, as early as 1986, Penn State's Office of Sponsored Programs (OSP) had implemented electronic databases.

The first system was a proprietary system that ran on a CPT-UNIX computer. Limited in scope, it only recorded basic information about the proposals and awards we processed; it did not have a proposal or budget development component. However, the system did enable college research administrators to...
access the database via a modem connection. While these forerunners were certainly ERA applications, they were not comprehensive ERA systems.

**Justifying the Need for ERA**

Significant resources are required to implement an ERA system. To justify such expenditures, upper administration must be convinced of the need for ERA. At Penn State, our commitment to the development of ERA was driven by the following factors:

1. **Staff Reductions.** The Office of Sponsored Programs (OSP) encountered severe staff reductions during the early 1990s. Penn State embarked on a rebudgeting program that was led by the “Futures Committee.” This committee set up a schedule that required units all across Penn State to “recycle” operating funds back into a central pool. Futile attempts were made to exempt expenses that were included in the indirect cost pools since these costs were reimbursable under OMB Circular A-21. By reducing the amount of funds spent supporting sponsored projects administration, we actually reduced income, thus further exacerbating our financial difficulties. The recycling required led to a 40 percent reduction in the OSP’s budget for operating costs and a 25 percent reduction in staff positions.

2. **Increasing Workload.** These staff reductions coincided with dramatic increases in workload. From FY85 to FY95, Penn State’s research base grew 250 percent larger, while professional staffing in OSP shrank by nearly 25 percent. During the period of FY91 through FY95 alone, the per capita workload of OSP staff increased by over 80 percent.

3. **Geography.** Over the past decade, OSP moved (in several steps) from the central campus to a site located three miles from the campus core. The logistics of reviewing and approving proposals and awards from this site was extremely cumbersome and resulted in the need for additional financial and human resources.

4. **Reengineering.** As reported in a previous study by the authors (SRA Journal, Volume XXIX, Nos. 1 and 2, 1997, pp. 25-31) Penn State developed a “distributed environment” for research administration. The nature of this “virtual organization” required instant access to shared data and documents across Penn State.

5. **Infrastructure Changes.** In the conversion from the CPT data system to a client-server network and database, the colleges lost access to their own data because the new system lacked essential security features. Thus, there was a strong demand from the colleges for renewed access to their data.

6. **Sponsor Demand.** As part of the Federal Government’s plan for streamlining governmental processes, a number of federal government agencies began to incorporate e-commerce into their systems, including those involving the receipt, review, award, management, and close-out of federal grants and contracts.

7. **Campus Demand.** Principal investigators, unit directors and research deans had been demanding an easy-to-use tool for project financial management for years. This particular need had been voiced at the highest levels of Penn State’s administration, and the demand for action had grown more intense.

**The First Attempt**

With all of these external and internal pressures, OSP was compelled to investigate the potential of ERA. Our first step was to join the ERA Demonstration Project. The ERA Demonstration Project was initially funded by a cooperative agreement from the U.S. Department of Energy to Federal Information Exchange, Inc. of Gaithersburg, Md. Its goal was to demonstrate a standardized method for the electronic creation, submission and processing of university research proposals. The demonstration focused on the implementation of EDI (electronic data inter-
change) standards that were being developed by the federal (interagency) Electronic Commerce Committee.

Agencies participating in the project eventually included: the National Institutes of Health (NIH), the Office of Naval Research (ONR), the Army Research Office (ARO), the Army Medical Research Acquisition Command (AMRAC) and the Air Force Office of Scientific Research (AFOSR). Participating institutions included Penn State, the Massachusetts Institute of Technology, Florida A&M University, University of Notre Dame, University of California - Los Angeles, Fred Hutchinson Cancer Research Center, Duke University, Baylor College of Medicine and the North Carolina State University/GAMS Consortium.

The project was successful; it demonstrated the “proof of concept” that a complete, computer-to-computer proposal transaction was feasible. It also demonstrated that federal agencies were interested in, and could move toward, electronic research administration. (See http://web.fie.com/web/era/project.htm for more information about the ERA Demonstration Project.)

In March of 1995, Penn State established an ERA Task Force to define Penn State’s needs in relationship to ERA. The ERA Task Force was comprised of research administrators, but it failed to involve important stakeholders such as faculty, executives and other interest groups. This proved to be a tactical error.

In early 1996, because of intense pressure from the faculty to have an improved post-award reporting system, the whole ERA initiative received executive attention and was put on a fast track by Penn State’s administrative information systems people.

There were not many ERA solutions available; those that were available were surveyed and costed out. After finding out the cost of the options, Penn State’s administration balked. Support for an ERA system, which had once existed at the higher levels of administration, evaporated. Because all of the stakeholders had not been involved in the ERA Task Force, there was no grass-roots support for the system, and the initiative did not have sufficient momentum to get through the period of “sticker shock.” Thus, the project was tabled and effectively killed.

We learned that if we were going to successfully compete for limited institutional resources, we needed to have strong university-wide backing.

We concluded that our failure to obtain the funding necessary to begin development of an ERA system was the result of our top-down approach. While it is (obviously) essential to have the support of upper-level administration, such backing can disappear if other competing needs have more grass-roots support. Resources are scarce and the competition for them is severe. We learned that if we were going to successfully compete for limited institutional resources, we needed to have strong university-wide backing.

The Second Attempt
(Or, if at first you don’t succeed…)

Our opportunity to gain that broader support arose in 1996 when a new Vice President for Research was appointed. In one of his first actions, the vice-president created a task force to review research administration and technology transfer. This task force began its work early in 1997. Its charge was “to make recommendations on ways to improve the University’s support of the research enterprise.”

The membership of the task force was diverse and included faculty, students and college deans. Associate deans for research, the controller’s office and research administrators (both central and college-level) also
were involved. In addition, there was a deliberate effort to receive input from other important Penn State stakeholders (facilities management, university development, indirect cost experts, etc.). The task force devoted considerable effort to benchmarking our processes and resources with other schools. These efforts included site visits to institutions that embodied best practices. Finally, the task force conducted a thorough analysis of the data collected.

One of the first topics reviewed by the task force was ERA. A study was completed by two research administrators on the committee (one central and one from a college) and the representative from the controller’s office. This study resulted in a 138-page report analyzing the state of ERA. It addressed the following general topics:

- What is ERA?
- What are funding agencies doing?
- What are private companies doing?
- What are other institutions doing?
- What is Penn State doing?
- What does the future hold?

The discussions ensuing from the report went on for many months. In the end, the task force recommended that the Vice President for Research and the Senior Vice President for Finance and Business vigorously pursue the development and implementation of a total ERA system, and that Penn State budget the funds necessary to accomplish this goal.

The “total ERA system” was described as, “an end-to-end, seamless, user-friendly system combining research support, information and project management.” The report called for a system that would provide on-line desktop access to an integrated distributed network linking the Office of Sponsored Programs with colleges and units. Moreover, the task force recommended a system that would allow faculty and staff members to access information about prospective funding opportunities, develop and submit proposals and progress reports, access accurate and informative financial reports and ensure timely invoicing.

The promulgation of this recommendation, and the broad consensus that it represented, permitted Penn State’s ERA efforts to shift into high gear. This was the first step in developing the grassroots support that was lacking in our first attempt.

Our next step was to present the Budget Task Force (this is the committee of senior university officers and administrators that makes final decisions on budget allocations) with the ERA recommendations. In spring of 1998, the Budget Task Force called for a study of how to best develop and implement an ERA system. This led to the formation of the ERA System Design and Implementation Advisory Committee.

The charge to this committee was to assist in the “review of system options and recommendations, selection of an ERA system and system implementation.” It was co-chaired by the Director of the Office of Sponsored Programs, the Assistant Controller and the Director of the Office of Administrative Systems (OAS). Once again, broad representation was recognized as essential to achieving university-wide support.

Grassroots support was again nurtured by including faculty, research deans, campus research administrators, financial officers, as well as representatives from the controller’s office, the human resource office and the telecommunications office. Campus computing personnel and OSP staff members were also on the committee.

The committee reviewed both systems that existed in some state of completion and those that existed only as “vaporware.” Systems that were assessed as having the potential to scale up to an institution the size of Penn State were selected for further study. Vendors for these selected systems were invited to come to Penn State to make presentations and demon-
strations to the committee. What became clear from these presentations was that no single, comprehensive ERA system (as defined by the Task Force) actually existed.

However, the committee recognized that components of a total system existed; some were already deployed at Penn State, some were under development at Penn State and some were available (or projected to be available) from vendors. The committee decided that the best approach (balancing cost, technical risk and time) for implementing a comprehensive ERA system was a systems integration methodology. Penn State would build a system out of components.

The committee identified the required system components (in terms of functions) and then identified the software applications that fulfilled the requirements. In conclusion, the committee recommended that the Grants Application and Management System (GAMS) form the hub of our comprehensive ERA system.

The committee’s recommendations were presented to important Penn State groups to further build grassroots support. Penn State’s Administrative Committee on Research (research administrators and financial officers), the Research Council (college and unit research deans and directors) and the Faculty Senate Committee on Research (all faculty members and researchers) endorsed the committee’s recommendation. In addition, the recommendations were presented to the Strategic Planning Task Force for University Administrative Information Systems, which not only endorsed the plan, but also made it a part of the Penn State’s AIS strategic plan.

The recommendation and endorsements were then presented to Penn State’s Budget Task Force. The Budget Task Force approved the plan and budgeted the requested funds.

**ERA Systems Integration**

While this whole consensus building process was being conducted, development of some other key components was proceeding. The office of Research Information Systems developed the Web-based SIMS (Strategic Information Management System) application for reporting on sponsored projects activity. Many different classes of users, from college research administrators, to department heads and college deans, to vice presidents were given secure access to a 10-year database of sponsored project proposals and awards.

The system has drilldown capability from campus aggregated figures to details on individual projects. Access to data is determined on the basis of job function and unit. The data can be instantly sorted by department, investigator and/or sponsor with a click of a button, and the display can be configured by the user.

Another ERA component that was under development was the Financial Information Tool (FIT), a Web-based financial project management tool designed for faculty. Previously, a client-server-based version of FIT had been deployed and while it worked well for financial professionals and research administrators (who are versed in accounting) it was considered unusable by the faculty because of its complexity and the specialized knowledge it required.

**In taking the “long and winding road” to ERA it is important to recognize that it is a journey that involves fellow travelers.**

The Web version is a complete redesign of the client-server version. It provides faculty with a quick snapshot of a grant account while at the same time providing the ability to drilldown to accounting details. The main window shows a summary of the account, based on the budget categories used by the National Science Foundation (NSF) and the National Institutes of Health (NIH). Financial data reported include the budget, expenditures, encumbrances and balance. The tool also shows account information in easy-to-
interpret graphical presentations and allows investigators to download account data easily to a spreadsheet, letting them develop what-if scenarios on their own.

Finally, the Office of Research Information Systems also designed and implemented a document imaging and management system. We purchased a system from a vendor (Optical Image Technology), and contracted with a consulting firm to help us integrate the applications with other Penn State ERA applications. The integration work is complete, and the system is operational through SIMS (on a development server at the time of publication), with new and archive data being entered daily. Beta-test users are currently able to drill down through SIMS from the highest level of aggregation right to the level of viewing an actual proposal, negotiation or award/contract document. Security for the system is provided by the SIMS security profiles, utilizing DCE security, ensuring confidentiality of proposal and award documents.

Our efforts in systems development helped us to better understand the functions comprising a comprehensive ERA system and how the various elements should be integrated. These main software applications will be integrated to form our ERA system; they include GAMS, SIMS, FIT, Penn State’s deployed financial system (named IBIS, the Integrated Business Information System) and the imaging and document management system. A high-level view of our system architecture is shown in Figure 1.

**Lessons Learned**

The process of developing an ERA system taught us a number of important lessons. The most important was to be sensitive to the needs, fears, egos and the turf concerns of our constituents and partners. In taking the “long and winding road” to ERA it is important to recognize that it is a journey that involves fellow travelers.

A second very important lesson we learned was that decision-making comprises both objective (rational) and subjective (emotional) elements and that these elements must be reconciled (made consistent) before a decision can be made. This means that the members of your advisory committee must not only agree to the facts and recommendations (obtaining intellectual/objective buy-in) but also commit their emotional/subjective support of the decision made.

Often it is easier to achieve intellectual/objective agreement than emotional/subjective agreement because it is difficult to
identify and address emotional issues. For example, if research administrators at the department level feel threatened by ERA because they fear ERA will eliminate the need for their job or increase their workload (two contradictory views that might actually be held simultaneously by a single individual), you are not going to get buy-in, no matter how logical your plan is, even if there is explicit agreement on the intellectual/objective level. You will experience resistance (and sometimes sabotage) at every step of the way.

Also, if there is any dissonance between the subjective and objective awareness of the institution’s primary decision-makers, a decision will simply not be made and the ERA initiative will die.

We also learned that the lifecycle of an initiative like ERA can be described as a “punctuated equilibrium.” By this we mean that change is usually manifested by a slow, evolutionary process; changes, when implemented, are incremental, and the status quo is generally defended. However, once in a great while, there will be occasions when, due to the entry of new forces (political, technical, or both), the landscape suddenly shifts and a brief interval of instability is created that permits (and sometimes encourages) rapid, revolutionary change. In our case, a task force was the political mechanism and the Web was the technological enabler that allowed us to wholeheartedly pursue ERA.

A final lesson is that success begets success. Or perhaps more properly, success begets the tools that beget success. In either case, to a great extent it was the Office of Research Information Systems’ successful deployment of SIMS that convinced many within Penn State that we might be able to design, develop and implement a comprehensive ERA system. The success of SIMS built confidence and trust among our constituents and partners.

**Conclusion**

In sum, our experiences at Penn State have taught us that to develop support for ERA, research administrators must:

- establish the need for ERA;
- build a consensus around do-able ERA solutions;
- involve stakeholders in the planning and implementation of the ERA system; and
- continuously market and sell ERA to all campus constituencies.

The process of implementing ERA at Penn State has not been easy or direct. There will undoubtedly be more to learn and greater challenges to overcome given the rapidly changing field of research administration. We hope the information contained in this article will be of use to other universities that are on the long and winding road to ERA.
A Case Study: Engineering a Plan of Action for ERA

Lisa R. Ballance, CCRA
Herbert B. Chermside, CRA

Abstract
Over an 11-year period, Virginia Commonwealth University (VCU) recognized the need for electronic research administration (ERA), developed specifications to meet its need and selected and procured a system. This paper reviews the process of evaluating five ERA systems and winning executive-level commitment to ERA at VCU. In pursuit of this goal, VCU reviewed perceptions of need for ERA at VCU, reviewed the overall research administration structure, identified five potential ERA systems, designed a needs-list for VCU, published a Request for Information and prepared comparative documents for system review. A system was selected with executive support. Implementation is under way.

Introduction
The introduction of modern electronic office and communications technology has made significant changes in university research administration over the last two decades. Perhaps this shift began with the page-to-page storage typewriter, which allowed proposals to be heavily and frequently edited without expenditure of excessive clerical effort. This was a modern-day wonder, just over a decade ago. Or perhaps it truly began as the engineering and “hard” science disciplines harnessed the mainframe computer for their research administrative purposes. Within a few short years, this technology had moved from “the computer suite” to the administrator’s desk.

What do you remember of the 1980s? Pop music? Economic decline? At the same time these things were occurring, researchers were investing in technology, and it is this technology that has catapulted research and research administration to a new level.

Today, researchers do not have to run down the hall to the mainframe to update the development of networking, from the office local area network (LAN) to the Internet, has made it possible for individuals to create, access, manipulate and share massive amounts of information.
results. Increasingly user-friendly languages, programs and interfaces have made computing a tool for individuals with little or no technical expertise. The development of networking, from the office local area network (LAN) to the Internet, has made it possible for individuals to create, access, manipulate and share massive amounts of information. Proposals and award information can now be transmitted electronically. We have entered the age of Electronic Research Administration (ERA).

Perceptions of Need for ERA at VCU

Virginia Commonwealth University’s (VCU) introduction to ERA was an article on electronic proposal processing at Clemson University (Latimer & McCracken, 1988). However, upper-level administration at VCU did not readily embrace the idea of ERA and held to the notion that ERA would require additional staffing and resources, beyond its benefits.

As early as 1987, VCU’s Research Advisory Council reported faculty dissatisfaction with the timeliness and comprehensibility of project account financial information provided to principal investigators (PI’s) from the enterprise accounting system, itself designed in the late ’60s. There was a significant delay between the time a PI requested a budget action and the commitment of costs. Frequently, only a transaction number identified costs, and printouts used accounting jargon unfamiliar to most researchers.

PI’s at VCU adapted to these difficulties in one of two ways. In research intensive departments, accounting technicians were employed and shadow accounting systems were developed. This enabled PI’s to receive reports on their project’s financial status, information necessary for good project management. In units that typically administered fewer awards, PI’s were left to fend for themselves, with varying degrees of success.

The VCU Strategic Plan of 1993, developed by the Commission on the Future of the University, called for a significant reduction in the university’s administrative costs, the elimination of unnecessary paperwork and a greater reliance on information technology. A study by KPMG Peat Marwick concluded that VCU should implement a new financial information system and make a number of other dramatic changes to the research support systems.

In response, a new Financial Access Network (FAN) was initiated in 1996. It was to be an enterprise-wide system linking all financial/administrative activities through a data warehouse, with the goal of decentralizing processes and accountability. For several reasons, this venture collapsed, with a loss of significant time and other resources. As a result, VCU’s senior officials became somewhat distrustful of complex, highly specialized, electronic systems for administration.

The next step in reengineering processes to support researchers’ needs and reduce administrative costs was a two-part study to identify ways to strengthen VCU’s pre-award and post-award sponsored program processes, initiated in 1997. The Process Owners Team, comprised of users of these services, was charged with the task of mapping the processes and identifying factors reducing efficiency. Based on the 1997 Process Owners Team report of current VCU practices, an Envisioning Team, consisting of users and deliverers of these services was created. The Envisioning Team was responsible for making recommendations to increase research at VCU, a goal in VCU’s second long-range plan.

The Envisioning Team released a report on their improvement recommendations in
1998. The report recommended that VCU increase its support for research administration at both the central and decentralized levels and develop electronic proposal capacity in the near future. Approval and dissemination of this report was delayed several months, possibly because its recommendations regarding increased administrative activity and investment ran counter to executive expectations.

As VCU struggled internally, federally mandated Electronic Research Administration (ERA) became a reality. This, along with increasing competition for research funding, pressure for compliance accountability, and other factors, forced VCU, as well as many other institutions of higher education, to reevaluate its support for the research enterprise. The following section describes how VCU has dealt with this challenge.

**VCU’s Research Administration Structure**

Two separate offices administer VCU’s pre-award and post-award functions. Focusing largely on pre-award matters, the Office of Sponsored Programs Administration (OSPA) reviews and approves sponsored program proposals, negotiates agreements with sponsors and interprets regulatory and contractual requirements. It reports to the vice president for research and is located on the Medical Campus of VCU, approximately two miles from the Academic Campus. OSPA used a homegrown database in Microsoft® Access to record proposal and award demographic and financial data. Enhancements to this program helped staff deal with the preparation of agreement and sub-agreement documents. For reasons of security, this database was not viewable, or useful, outside of the office.

The office of Grants and Contracts Accounting (G&CA) at VCU establishes accounts and maintains accounting records for all sponsored research. It also prepares financial reports for sponsors, prepares bills in order to recover direct and indirect costs and interprets financial requirements. G&CA reports to the vice president for finance and administration and is located near the Academic Campus. Although OSPA’s database could provide at least half of the information electronically that is needed to establish an account, resources were not made available to generate the necessary interface to the legacy accounting system.

Regulatory Compliance Offices such as the Institutional Review Board, the Animal Care and Use Committee and the Radiation Safety Committee are independent of one another, reporting directly to the vice president for research. Their administrative offices are located exclusively on the Medical Campus. On these two urban campuses, parking is expensive and frequently unavailable. Even though there is a shuttle bus running twice an hour, moving people and papers is inconvenient, at best.

Thus, in 1997, there were significant tensions affecting VCU’s research enterprise. Researchers wanted more support and administration wanted less cost. Researchers wanted faster and more convenient support; research administrators faced increasing demands from sponsors without any prospect of adding more personnel. Communication among constitutencies was poor, and duplicative data entry was endemic. Electronic communication was hindered by the variances in equipment; PCs did not reliably talk to Macs; desktops did not easily talk to mainframes. The 21st century was almost upon us, and we were not ready for it!

**The ERA Systems Review at VCU**

This confusion was leading different groups within VCU to seek and to advocate for separate solutions to their own perceived (and conflicting) ERA needs. This, and the perception that electronic proposal submission would soon be mandatory, led VCU to seek a study of research administration software systems available or under development. The objectives of this study were to identify current and future capabilities, implementation costs and ongoing support costs.

It was clear that evaluating VCU’s needs would require more staff time and energy than was currently available. Also, it was apparent that all factions within VCU needed to be certain that the evaluation process would be
objective. The charge was to hire an outside consultant to design and prepare an analysis of available ERA systems so that VCU could choose those they wished to see demonstrated and, finally, to purchase.

The following plan was proposed to the VCU administration by the outside consultant. With the plan approved, the tasks were carried out and the resulting deliverables formed the body of a guidebook for identifying appropriate ERA technology:

- **Task 1:** Interview the process owner team members regarding specific requirements within their areas and where they see opportunities to share data electronically.
  
  *Deliverable:* Interview log and summary of area needs by category.

- **Task 2:** Draft and execute a Request for Information (RFI) targeting a select group of five ERA Systems Engineers and Consultants.
  
  *Deliverable:* RFI publication including distribution and management (log) of all inquiries

- **Task 3:** Collect individual vendor proposals (responses to the RFI) drafted in response to VCU’s unique needs.
  
  *Deliverable:* RFI individual responses, collective response document (comparing responses by area and category)

- **Task 4:** Compare responses objectively
  
  *Deliverable:* Collective response document comparing responses by area and category (e.g., area=security, category=password functions)

- **Task 5:** Develop a tool for summary review of systems
  
  *Deliverable:* Using a matrix of VCU needs and system specifications, the RFI responses were registered and scored according to how each particular need was addressed: (function or feature available as described, available with similar function, in development, considered as additional cost/add on, or not available). This data was also compiled into a Systems Review Summary Report.

- **Task 6:** Compile a final report and executive summary
  
  *Deliverable:* Compilation of the following in reference manual form. This reference tool became the mechanism for selecting vendors to interview, baseline knowledge of system capabilities and dramatically reduced the time spent reviewing marketing materials, system specification lists and product descriptions.

### Designing a Needs List for VCU

Although their reports had not been released, the process owners team and the envisioning team were adamant: “Electronic submission software should be explored immediately.” Based on their input, as well as that of OSPA, the minimum requirements included:

1. Formalized faculty training to include on-line guides and templates;
2. Automated matching of faculty interests with funding opportunities, including electronic notification of funding agency deadlines and sponsorship areas;
3. Tracking and scheduling research risk applications, proposals and the associated deliverables;
4. Collaborative editing and review of research risk applications, proposals, subcontracts and project results;
5. Automated routing of documents for the review and approval process;
6. A security system that would meet all department, institutional, industry and federal requirements;
7. Electronic proposal submission;
8. Electronic processing of award, including notifications, updating of terms and conditions and account set-up;
9. Electronic award management, including subcontract management, modifications and reallocations;
10. Electronic deliverables and reporting management;
11. Integration with legacy accounting system FRS (DB/2);
12. Integration with human resources system (internal); and

From these 13 items, interviews with each of the team members resulted in 141 specific requirements, which were easily grouped into the categories listed in Table 1.

![Table 1: Categories of Concern](image)

With each specific requirement detailed and categorized, one approach would have been to review each vendor’s literature regarding its capabilities in each area. However, the sheer enormity and inconsistency of the marketing literature was daunting. VCU opted for using a directive approach. We put our goal, objectives and needs out in the marketplace in the form of a Request for Information or RFI and requested vendors to make a direct response.

**Designing a Request for Information**

Armed with very specific minimum requirements, drafting the Request for Information (RFI) document was a matter of translating the above needs into capability inquiry statements, developing a timeline and process for respondents, setting a deadline for questions to be answered and developing a tool for summarizing system capabilities.

The “Request for Information” document solicited very specific information from a group of vendors who had marketed their capabilities for electronic research administration. We presented a brief introduction and background information about the VCU system. To encourage vendor response, we also described our plan to review ERA systems for the purpose of identifying a vendor and purchasing ERA tools based on our needs.

RFI’s must contain certain information. For example, vendors need to know how to reach you regarding questions that they may have about not only your specific needs, but also about the appropriateness of their investment in providing a response. Some of the necessary sections includes:

1. Information about your organization
2. The deadline for responses from vendors
3. The deadline to receive all questions
4. Acceptable methods of response
5. Disclosure restrictions
6. RFI instructions
7. Application description

**Organizational Information:** How do your pre-award and post-award systems function? What is your organizational structure? Are there legacy systems in place that your institution is “married to” versus “simply settling with for now”? On the part of VCU, of greatest concern was using a consultant to devise and manage the RFI. It was necessary to have many joint meetings with the consultant and work closely when responding to specific vendor queries during the question period.

**Deadline:** The importance of setting an appropriate deadline and making this information immediately known is quite obvious. But, what is a reasonable period of time for vendors to respond? VCU allowed for five weeks. We determined that several of our targeted vendors would be able to respond within a two-to-three-week period of time, so allowing for double the time seemed not only fair, but also certainly adequate.

Interestingly enough, one company was able to respond within two weeks and the remaining responses were, literally, down to the wire. Regardless, the imperative is not to make exceptions, thus allowing ample time for all your target vendors. A great way to do this is simply call all targeted vendors and announce the upcoming RFI and advise that the response time will be limited to X weeks.
This affords the vendor with an opportunity to make you aware of any “new product releases” or other extenuating circumstances which might conflict with providing you with up-to-date information within their response.

Questions: Because all of us are fallible, it is important to provide an opportunity for RFI respondents to request clarification regarding the description of your needs or key details regarding your technological environment. We found that each vendor did take an opportunity to ask questions within the period allowed (up until the due date, in our case). The simple rule exists with RFI’s, the better information put out, the better the information brought in.

Methods of Response: VCU allowed for two methods of response, electronic and hard copy. In other words, the vendors needed to respond to the direct questions of the RFI in one of those two ways. It was made clear that simply providing a “demonstration copy” of the ERA system software would not meet the requirements of the RFI, unless provided in addition to the response to the direct inquiry statements (outlined in the RFI).

Disclosure Restrictions: VCU wanted as much detail as possible about each vendor’s capabilities for providing a system that would meet the institution’s specific needs. In some cases, this meant that the company had to reveal capabilities recently developed or under

### Table 2: RFI Instructions

**INSTRUCTIONS:**

The ERA Systems Provider should respond to any or all parts of this RFI. This RFI refers to the request for information regarding a “total” business need including hardware requirements, software, training, documentation and other areas as required to develop a total solution. Alternative solutions (e.g., system contractor) will be considered.

**Section 1.0 Summary**

A brief description of your product, its major strengths, how it meets VCU’s requirements and a synopsis of support options.

**Section 2.0 Solution Description**

A technical overview of your product, including laymen’s terminology as well as technical descriptions. Existing product literature may be included here.

**Section 3.0 Hardware/Software Requirements**

Responses must include a description of all hardware and software required. In addition, recommendations must be included for network, size and configuration of server, storage type and capacity, and other system requirements to operate the system to meet VCU performance requirements.

**Section 4.0 Service and Support**

Describe service and support offerings and price. Indicate options available.

**Section 5.0 Company Profile**

A brief description and history of your company, including the date founded, whether it is publicly or privately held, and any business partnerships pertinent to this RFP. Describe the experience, capabilities and qualifications of your company within the industry. Include an overview of your current ERA activities and customers.

**Section 6.0 Pricing**

Provide detailed pricing information for components proposed. Provide software pricing broken down by module and/or feature. Include itemized costs for installation, data conversion, training and maintenance. Describe any other costs associated with the system purchase (e.g., integration utility and/or programming costs). Also, describe any potential payment schedules.

**Section 7.0 Vendor Experience**

Responses must include information about the vendor’s past experience with computing systems (hardware and software), research and sponsored programs, contracts and grants, training, documentation and other areas related to this effort. The names of three clients from a university or research environment for which similar work has been completed must be attached. This list should include a contact person, address and telephone number. The list should also include a brief description of the solution provided.

**Section 8.0 Application Description**

In reference to the Application Description document, attached, responses should be clearly stated, with comments describing function (or alternative approach), as necessary. In this case, providing more information, within the “Comments” section is strongly encouraged, as it may clarify your approach.
development (disclosing the status of availability). For the purpose of confidentiality, we provided a disclosure statement indicating that all information provided in response to the RFI would be subject to internal review at VCU only for the purposes of leading to the identification of an ERA software system. Furthermore, we requested that all information that should be held strictly confidential be so marked. Information so marked would not be disclosed beyond the purpose described within the RFI, unless required by state or federal law.

**RFI Instructions:** Within the RFI we included overall instructions and specific instructions for each section. This information is presented in Table 2.

### Compiling Responses/ Final Report

Once the RFI responses were received, compiling them was relatively simple, largely because all but one vendor provided an electronic document in conjunction with a hard copy. Two documents were made using the electronic responses, a Collective Response Document and a System Analysis Grid.

The Collective Response Document contained all the VCU requirements, section
by section, and outlined each vendor response. In this way, “apples were compared to apples,” so to speak. This document served as the primary reference document for a number of individuals and groups at VCU who had been informed by one vendor or another — or by their advocates — that only their preferred system satisfied some crucial need. Sometimes a claim proved true, but frequently it became clear that another system could provide satisfactory results.

The System Analysis Comparison Grid (see Table 3) was a more structured document in which a coding system was used to “grade” the function and availability of each feature required by VCU. This became a very powerful tool for detailed analysis of the data acquired from the RFI. A sample page is attached, with individual vendors’ names omitted. The coding system that allowed us to “tally” results and help support system preferences is presented in Table 4.

The final report (Ballance, 1997) provided VCU a comprehensive review of five ERA systems. This report dramatically reduced the time VCU’s personnel spent reviewing marketing materials, conducting site visits, evaluating recommendations and advancing toward a decision. This reference tool was made available to VCU’s decision-makers as a simple three-ring binder containing the following:

1. Executive Summary
2. ERA Systems Review Summary Report
3. Collective Response Document
4. System Analysis Comparison Grid

5. Supporting Documents
   - Process Owner Team Results
   - RFI Distribution List
   - Request for Information
   - Interview Log
   - Grant Application Transaction Set-194 (partial)
   - Internal Reference Resources

**Final Procurement Decision**

With the final report in hand, VCU’s OSPA personnel rapidly were able to determine that three of the systems could not reasonably be used by VCU. One system, for example, involved participation in a multi-institution consortium during development. However good the final result might be, VCU was now gun-shy of that approach. Another vendor required use of a specific enterprise-wide database, and VCU’s Office of Information Technology had committed to a different one, thus, no technical support could be made available.

In late 1997, an *ad hoc* committee was developed to advise the vice president for research on which system VCU should procure. It included such users as researchers, departmental administrators, OSPA, G&C Accounting and such support or other interested parties as OIT and the financial advisors to the vice presidents of each campus.

These groups reviewed the Executive Summary and the ERA Systems Review Summary Report, with the entire report on hand if detailed answers were needed. Two
vendors were invited to give on-campus presentations. These presentations demonstrated that in at least two crucial areas, one vendor’s product better suited VCU’s needs. The vendor that best suited the specific and unique needs of VCU was invited to make a quotation on the desired portions of its system. On April 29, 1998, the vice president for research accepted this quotation.

The vendor was clearly aware that the funding for such a significant purchase would not be available until VCU was operating on the following year’s budget. The need for an ERA system had been perceived by researchers and their supporting constituencies, and had been brought to executive attention in the process of executive search for cost reductions! It was only by convincing executive management that proposals to federal agencies would need to be submitted electronically in a few years, that executive management was willing to consider the expense. During that year, the final report was referred to frequently in demonstrating reasons for selection of the final vendor.

On July 1, 1999, funds for procurement of the selected system were made available. Executive management continued to have doubts of the wisdom of the procurement. Finally, in August 1999, a group of five VCU senior personnel visited the vendor’s establishment. A further presentation, discussion with referenced institutions, and the development of a trustworthy relationship persuaded the vice president for research to commit to the purchase.

Then, of course, it was necessary to process a sole source procurement. VCU’s procurement system had to meet state requirements. The final report was made available to the purchasing agent as reference material. “You’ve really done your homework!” was one of the most rewarding comments heard!

Oh, yes! The purchase order was issued on September 29, 1999, and implementation of VCU’s ERA system is under way as the last words of this paper are being written.

References
Feature

Considering the Human Element of Electronic Research Administration

Pamela A. Krauser

Abstract

Electronic Research Administration (ERA) is changing the way we prepare and submit grant proposals and administer awards. As the shift to increased reliance upon technology continues, we must remember that ERA is not simply a technology issue. It is actually a business issue, and the most important asset of any business is its people. As tasks and how they are performed change, we must not overlook the effects that these changes have on the people who must implement them. While we use the technology to do the job, it is still the people who do the work. Technology often promises to make life easier, but in reality it does just the opposite, especially in the short term. Additional work requirements combine with human abilities, needs and emotions to create problems that can diminish the effectiveness of even the best technology. Many personnel issues arise when new technology is introduced, including the fear of change, different staffing needs, the definition of new roles and responsibilities, and new training requirements. We need to remain cognizant of these issues and plan for them in order to take full advantage of the technology available to us.

Introduction

As rapid advances in technology become commonplace, the way we do business is changing more quickly than ever before. It is not only important that organizations embrace new technology; they must embrace the concept of change as well. Today’s technology will probably not last long before newer methods are introduced. Virtually no organization or job is static now.

In research administration, as in many other fields, we must respond to external change while facilitating our own internal change. We must adapt to the electronic systems of sponsors and other agencies and in turn seek ways to make our own internal systems more capable of handling both external needs and the institution’s own needs as we attempt to utilize our data better and eliminate redundancy through technology.

In this rapidly changing environment, we need to constantly remind ourselves that technology is only a part of any organization and that people are also part of that organization. Technology aids us in completing our work,
"In this rapidly changing environment, we need to constantly remind ourselves that technology is only a part of any organization and that people are also part of that organization."

While implementation of ERA may be relatively new, many other fields have already experienced similar technological change. Our needs will undoubtedly vary in some ways, but we can learn from the experiences of those in manufacturing, retail and libraries, who, among others, have gone this way before us. In some ways, even we ourselves have been here before, as we first introduced word processors and databases into our daily routines.

We should not forget the human element of ERA, and should therefore consider the roles of people in its implementation. This paper concentrates primarily on the experiences of the sponsored research office, but will also touch on the effects on principal investigators (PIs) and departmental staff as well.

More Information, More Work

In the early stages of its implementation, technology necessarily increases the workload of an organization. Until the new procedures are learned, most job functions will take longer to perform. We all know this, yet we are still surprised because we expect technology to transform our lives instantly.

As PIs prepare their first electronically submitted proposals, for example, they often become frustrated with the new technology and remark that they thought electronic submission was supposed to be easier than paper. Although most of them realize that eventually it will be, once they have learned the system, the short-term prospect of spending more time on the current proposal than the last one is hard to overlook.

Research administrators and support staff also experience the same tensions as we adapt not only to changes in the way our own jobs are done, but simultaneously must train the PIs for the new things being required of them. Further, most of us underestimate the time required to complete a task, often because we only count the time we spend typing at the computer. We often overlook things like time for research, training and technical difficulties. Until we all reach a flatter area on the learning curve, we need to allot more time for our work than in the past.

In addition, when there is greater capacity for handling information, people tend to expect more, and expect it faster. This in turn creates more stress. We used to wait for award documents to arrive via regular mail. Now, we receive many by e-mail. Consequently, we, and our investigators, expect a much quicker official notification after receiving preliminary word of an award from a program officer. Moreover, now that we can search for funding sources electronically, people expect an almost instantaneous reply. Where previously we may have had to wait for a funding agency to send a printed copy of the guidelines, now we can download it from the Web immediately. Someone who would have accepted a few days’ delay in getting information may now become impatient if it takes a few hours.

but it is generally not the ultimate goal. We need to keep sight of our mission and remember that technology is only one of the components helping us to achieve it.

People are still responsible for designing the technology, as well as operating and entering the data into the technology; consequently, they can make or break the implementation of a system. Successful adoption of technology is not only a function of the system being used and the job to be done. It is also a function of employee perceptions and expectations. As we implement ERA, we must consider that we are dealing with people, too, if we want to succeed.
We also find ourselves multitasking in an effort to keep up with the capabilities of technology. While talking on the phone to a PI we may be e-mailing a program officer to get an answer to the question we are discussing. This may seem productive, but humans are not designed for such full-scale multitasking and will experience stress.

In departmental and central research administration, we are reviewing more draft proposals than ever before. With the National Science Foundation’s FastLane system, for example, it is easy for a PI to allow early access to a proposal electronically, rather than printing a paper copy and walking it around. Especially at a time when people are uncertain about how a system works, the added benefit of having another pair of eyes look at the proposal is compelling. Consequently, more PIs now ask that we look over a rough draft to see if there is anything that needs to be changed while they are still working on the proposal. While this can save last-minute hassles, it means that we are actually reviewing more proposals than our statistics show.

Faculty and staff may now spend considerable time troubleshooting technology. Where research administrators were once called upon to interpret guidelines, we now do that, and provide technical assistance as well. Unless an institution is fortunate enough to have a very supportive technology office, the research administrator or a support staff member may now be needed to help solve technical problems.

Comments from librarians indicate that troubleshooting hardware and software is the biggest nuisance and hindrance to providing good service to their patrons (Tenopir, 1998). Research administrators also feel that frustration as we attempt to meet deadlines and solve technical problems at the same time. Technology has definitely increased our workloads in this area. In the past, PIs probably would not have thought to come to our offices for help with word processing software. But now that technology is required to actually submit the proposal, we are expected to be able to troubleshoot it.

Because we have the capability to retain greater quantities of data with more efficiency and lower space requirements, we are inclined to keep track of more information. Consider, for example, an organizational database that allows staff members to keep track of more regulations and pre-approval requirements. While the system is definitely more efficient and can have substantial payoffs when questions arise, it may take longer to set up the initial award information since so much more information is being tracked for a single award.

In addition, we must allow time for internal systems management. Undoubtedly there will be problems with our hardware or software at some point. We will want to make improvements or upgrades. Consequently, we will require extra technical help, and/or other staff time to evaluate needs, solve problems and create new programs. Instead of providing us with vast amounts of free time, as technology was once predicted to do, we find instead that our days are fuller and longer than ever.

Developing the Right Skills

Many people assume that automation means that fewer job skills will be required of an employee. They compare the office to an assembly line, where each person does a small part of the job, and knows little about the remaining operations of the office. Further, like an assembly line, they argue that with such specialization, the tasks become more mechanical and require less skill and thought on the part of the worker.

To be sure, many jobs are now highly specialized, since many work environments are very complex. Even within research administration, it can be very difficult for one person to keep up with the guidelines and regulations of many sponsors. Implementation of electronic systems adds to this, especially when many sponsors develop different systems. Librarians also found this to be true, as different databases used different search mechanisms and had different capabilities. They needed more skills in some areas, not fewer.

In many situations, technology actually creates a need for additional worker skills. In addition to increased technical knowledge, the most sought-after employees are those with
troubleshooting or problem-solving skills. As mentioned earlier, research administrators may now be called upon to provide technical assistance, such as software recommendations and installation or help in saving a document as a portable document format (pdf) file.

We may be asked to help determine what is wrong with a system or what a PI has entered incorrectly. Many manufacturing firms learned before us to rely heavily on the problem-solving skills of their line employees. Line employees are closer to the source. They often are faster than their engineers in determining what is wrong. The ability to quickly troubleshoot a machine and get it running again allows the production line to keep running and prevents lost production time. Likewise, the research administrator may now need to solve software problems that could prevent a PI from submitting a proposal or meeting a deadline. Because we have more experience with the systems, we may be quicker than technical personnel in solving the problem.

While technology may do most of the job for us, employees still need to know how to do the work without the technology in the event that the technology fails or is otherwise not available. Reliance upon computers to generate budgets, for example, is fine as long as the computer is up and running. An understanding of the components and calculations in a spreadsheet are still important in determining entry errors, as well as when a server is down.

The most critical skill requirements for most environments that rely heavily upon technology are employees who are willing to learn and take on responsibility. In fact, many companies now admit that employees must constantly learn new skills just to keep the jobs they already have. In their career management brochure, Apple states that they cannot guarantee lifelong employment, and that it is the employee’s responsibility to drive his or her own development and career (Dubal, 1997).

Like Apple, we cannot provide job security, but we do need to provide an environment that fosters and values learning so that employees can ensure their value in the organization. Employees need to understand that the job they hold today most likely will not be performed in the same way in a year, and that keeping their skills updated is a way to maintain their value to the organization. Management needs to make certain that employees are given the opportunity to learn by providing training and communicating the need for constant skill updates and the importance of possessing many skills.

Specific skills, such as experience with a particular software package, become outdated very quickly. As skills become obsolete more rapidly, the ability to perform the other functions needed by the organization becomes critical. Hence, multiple skills are an important asset for the employee and the organization. This changing environment also offers employees the opportunity to move into new positions and challenges them to grow.

**Human Ability, Needs and Emotions**

We must also consider an individual’s ability to handle greater responsibility. Because of the rapidly changing environment, many people are performing totally different jobs than the ones for which they were hired. While additional responsibility was generally based on the individual’s performance and came in the form of a promotion, people are now simply expected to take on more responsibility without a significant change in status, and sometimes without considering whether they are ready for it. This, of course, places greater stress on people and may make it more difficult for them to learn.

We must also consider a host of human needs when implementing technology. First of all, we need to think of physical needs. Will focusing on a computer screen all day contribute to eyestrain? Will people suffer from muscle strain or repetitive stress injuries? While we may be capable of doing a greater volume of work with the aid of technology, we must remember to schedule frequent breaks from it in order to prevent physical problems and alleviate boredom.

People also have emotional needs that must be considered in the workplace as well. Of particular importance are the fear of change and the loss of status. Most people fear the unknown, and change is the ultimate
unknown. We become comfortable with those things we have done regularly for long periods of time, and are secure in our ability to do them well. When a new system is introduced, we feel less knowledgeable. We no longer know how to do our jobs. This not only makes people feel insecure; they may in fact become defensive. Defensiveness may exhibit itself in hostility towards the new system, jeopardizing its successful implementation.

Throughout the change, we also need to be aware of the loss of social interaction that automation brings. While there may be little we can do on a large scale to prevent this, we perhaps should consider ways that we can still use the “human touch.” Sometimes it is as easy as walking to someone’s office rather than calling or e-mailing for every question. We can also encourage the scheduling of training sessions, where administrators and staff can get out to train the end-users of a system and meet them face to face.

Another reason that many people fear technological change is the assumption that it will result in the loss of jobs. It is in fact possible that some institutions will decrease staff as automation increases and there is pressure to keep costs down. What is likely to happen, though, is that jobs will change. Many middle-level jobs may be phased out as computers do more of the tasks once assigned to people. Lower- and higher-level jobs may replace some of the mid-level jobs as more clerical people are required to enter and retrieve data and, at a higher level, more decision-making skills are required.

While some staff members may perform more data-entry roles, others will acquire new skills that will expand their roles. Even those staff with data entry responsibilities, however, may now be entering data directly into the corporate database, where accuracy will become more critical and errors will have greater impact. When point-of-sale systems are introduced in retail, orders are often determined based on the information keyed or scanned at the cash registers. If inventory is ordered based on items entered as sold at the registers, incorrect entry can mean that goods will not be on-hand when they are needed. In research administration, if information is not entered correctly into a database and we pull that information from the database for proposal budgets, we may not request sufficient funds for a project.

The Need for Training

Training is critical when technology changes. Faculty and staff will need training in the use of new systems. While in the past we may not have found ourselves in the role of educator too frequently, now it can be a major part of the job. Librarians learned this before us. When card catalogs and other search mechanisms went on-line and enabled patrons to do their own searches, some felt that librarians would no longer be necessary.

Instead, librarians found that they spent a considerable amount of time training the patrons to use the technology. Their jobs had changed, certainly, in that they were no longer necessarily directly searching for the information, but they still had to guide their patrons in search techniques. Librarians evolved from being the actual keepers of information into experts on how to find information. They also found that they needed to understand something about the systems in order to perform troubleshooting functions when the technology went awry.

Like librarians, we may now find ourselves spending more time teaching workshops and answering one-on-one questions about the technology and how to use it, or how to find information relevant to using a system, preparing a proposal, or finding a funding source. We still need to know about sponsors,
guidelines and other related issues, but we now use different methods to perform our jobs. In fact, like librarians, we find that we need not only most of the skills we have always needed, but also many new ones, and especially, technical skills. Conducting a workshop now necessarily includes both using technology and helping others to use it.

Administrators and staff also need to be trained to use new systems. In many cases, what we are doing is “training the trainer,” or teaching those who will actually work with PIs in the preparation of the proposal. This is a critical function for us in that it provides additional resources that we can rely upon to ease the burden of increased demands on our time.

Training is critical when technology changes.

Another area where training is important is in alleviating the fears that so many people have about technology. While most of us have gone beyond the fear that we will erase the entire contents of a system with a single keystroke, there are still people who are not comfortable with technology. We need to be aware that people have different levels of skill and comfort with technology, and provide them with the training they need accordingly. People will adapt to using those things that they are comfortable with, so providing users with the expertise they need will help ensure that they will want to use the system.

Recommendations

As we look back upon the past and contemplate the future, how can we use what others have learned to smooth the way for our own increasing reliance upon technology? First and foremost, we must communicate with all of those affected by the changes. People fear less what they know than what they do not know. When there is no communication, people will often speculate and try to predict the future. Most often, their perceptions are much worse than the reality, which in turn may make attitudes worse and slow or even prevent the successful implementation of new technology.

We need to communicate with our research administrators, both at the central and departmental levels, to keep them informed of what is coming. Keeping people in the know makes them feel more like part of a team, which can be critical in implementation of new methods. Including them as early adopters gives them more of a feeling of ownership and therefore more of a stake in the success of the technology.

Communication should be two-way as well. To the extent possible, those who are involved in the implementation should be given a voice in the directions that it will take. Granted, we are constrained in the use of agency systems, but we have more latitude in the design and implementation of our own internal systems. The end users often have the best insights as to how things may work and what else may be affected by the changes. Again, this early input will also help them to take ownership and responsibility for the success of their suggestions. It helps to explain why some things must be done in a certain way, as opposed to the way they would most prefer. When suggestions or requests cannot be implemented, clear reasons should be given.

PIs should also be kept informed so that they are better prepared when things change. We should not only allow them time to prepare for the change, but should solicit their advice as well. For example, some assumptions have been made regarding who actually types the text of a proposal. It has been assumed that, with word processing technology on everyone’s desk, most PIs actually typed their own manuscripts, so some systems were designed based on that assumption. In reality, clerical or student assistance with these tasks was common enough to make it awkward to implement some aspects of the system.
Early communication is also a way to calm their fears about the security and integrity of their data by giving them time to learn about the measures taken in these areas. It also gives them time to locate any needed software or hardware, instead of adding that to the last-minute stress.

Allowing for experimentation, and sometimes even for failure, can help people with the transition. Demo sites are especially helpful, since people can feel free to experiment and make errors with no consequence. If that is not an option, we need to explore other possibilities that will allow people to use the technology without fear of “messing something up.”

There are many arguments about how change should be introduced. While gradual change may frustrate many people, it is the best way for others. Some people would rather dive in and get it over with. In the argument for gradual implementation, though, we can note that people have time to adjust to small items, rather than being hit with everything changing at once. Although it does mean that we are constantly learning new things, gradual change keeps us in the learning mode, which is important. We know that things will continue to change rapidly, and the easier it is for us to accept constant change, the better equipped we will be to deal with whatever the future holds. In addition, gradual change may be the only economically feasible way for some organizations to implement change since significant outlays of cash are often necessary.

To alleviate people’s fears about no longer knowing how to do their jobs, we need to stress just what type of knowledge is important. Understanding exactly how the technology works may not be as important as knowing how to perform specific troubleshooting activities, or how to do the work manually, which many already know how to do.

**Conclusion**

There are undoubtedly many issues that need to be considered as we continue to implement ERA. Most importantly, we must not forget that people will be critical to the success of any system. Consequently, we must address the issues mentioned, as well as others, if we hope to make a smooth and successful transition into ERA.

**References**


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*Keeping people in the know makes them feel more like part of a team, which can be critical in implementation of new methods.*
Feature

The Strategic Role of University-Industry Liaison Offices

Yves Fassin

Abstract

Changing environmental demands and the increasing importance of science and technology have added a new dimension to the university’s role in society: economic development through technological innovation and transfer. In recent years, a new administrative entity — the university-industry liaison office — has emerged as an important partner in this process. The university-industry liaison office has three main tasks: disseminating information about the university’s research potential, developing partnerships among the university, business and industry, promoting “entrepreneurship” within the academic community.

This triple role allows the university-industry liaison office to have a major impact on the image and the reputation of the university. As university service to the community increases over the next decade, the importance of the university-industry liaison office also will grow. This article describes how a university-industry liaison office can enhance the contribution a modern university makes to the economy of the region, the nation and the world.

Fifty years ago, the university’s role was restricted to research and training young people for a place in society. Nowadays, industry has a growing need for the specialized know-how, information and advice available from universities. As a result, universities are playing an active role in the process of technological innovation by licensing inventions and discoveries to industry. Spin-off companies, science parks and incubators are examples of the results of university-industry collaboration (Bok, 1982; Bullock, 1983; Stankiewicz, 1986; Wade, 1986).

Governments have encouraged such arrangements by including service to society and to the industrial world, along with the traditional objectives of education and research, as part of the mission of the university. In different countries, the law has been adapted in recent years to include this objective and to “officialize” the economic role of the university for the region and for society.

In return, industry has contributed to the research enterprise by helping to finance university research programs. Increased costs for scientific equipment and insufficient governmental funding have obliged universi-
ties to look to a variety of sources — including industry — for a new means of financing research. The combination of university knowledge and industrial financial support has lead to innovation and the creation of new businesses, jobs and wealth. However, these outcomes are not always easy to obtain. Successful cooperation between industry and the university requires a special kind of synergy. To achieve a successful cooperation agreement, both parties need to be aware of each other's interests and objectives as well as each other's complementary strengths.

The following article describes how industry can benefit from various university services and analyzes some important characteristics of the innovation process. The importance of intermediary organizations and networks in the technology transfer process are described. External and internal marketing of R&D services, including the costs and potential value of the innovation process and the risks involved, also will be discussed in relationship to the strategic role of the university-industry liaison office.

**Overview of University-Industry Interaction**

In a knowledge-based society, access to information is critical. It is one of the most important services a university can provide to business and industry. University personnel can provide expert advice, help in conducting targeted experiments and laboratory work, and assistance in analyzing data. Institutions of higher education also can provide continuing education for industry personnel. In recent years, institutions of higher education have begun to directly contribute to the economy of the region surrounding the university through the process of technology transfer.

Technology transfer begins with industry and university interaction. According to Van Dierdonck and Debackere (1988), interaction between industry representatives and university faculty follows a predictable sequence. Initially, faculty members serve as consultants and assist with data analysis. At the next stage, industry may choose to license innovations developed by university personnel. Spin-off companies based on these innovations generally follow.

As the university becomes more involved in technology transfer, the establishment of a science park and an incubator for new technology-based start-up companies is a matter to be considered by university administrators and the university board of directors or trustees. The establishment of such entities reflects a university’s commitment to the region’s economy. The final step in the technology transfer sequence is the establishment of a venture capital fund, attached to, or managed by the university.

The above overview is not meant to imply that industry-university collaboration is an easy task. It presents a double challenge: working with people and working within the difficult discipline of innovation. Collaborative work between and among people has its trials, successes and failures. Although there are advantages to collaboration, barriers may arise to prevent cooperation.

Van Dierdonck and Debackere (1988) identify three types of barriers: cultural barriers (mutual incomprehension), institutional barriers (unclear norms and policies) and operational barriers (problems arising during the implementation of the project as result of rules, norms, etc.). These barriers can occur on both the industrial and university side of the collaboration. The differences in university and industry cultures are examined in the following section.
University vs. Industry Cultures

The culture and objectives of industry and higher education differ. The university scientist uses a long-term approach to research and is devoted to academic freedom and publication. Faculty members are typically concerned with tenure and promotion decisions and salary increases based on merit. In some academic departments, applied research may not be rewarded as much as teaching or basic research.

The benefit of collaborating with university researchers is fairly clear to business and industry. However, the industry culture emphasizes applied research, secrecy, protection through patents and typically employs a product-driven approach (Fassin, 1991).

It is important to recognize that technology transfer occurs when university faculty and representatives from business and industry work together for mutual gain. Therefore, industry-university collaboration cannot be forced and cultural differences must be understood. Table 1 presents a comparison of industry and university objectives.

As Table 1 implies, universities and industry work in two separate worlds driven by different objectives. Today, although universities and industry have begun to recognize how they can work together for mutual benefit, a problem still exists: industry does not recognize the university’s potential, and the university does not know the exact needs of industry. This problem is due to a lack of information on both sides.

Traditionally, universities have been rather passive in this area, which has reinforced the image of the university as an “ivory tower.” The transfer of information and university collaboration with industry has, in the past, often been the result of a fortuitous event, some accidental meeting between a professor and an industrial manager, often through alumni or private contacts.

Modern industry, however, has a track record of seeking information from marketers and R&D people to better understand the real needs of their customers. Therefore, industry has been willing to look for new ideas from suppliers and all potential sources of information, including university research laboratories. Many big companies have special officers to survey and to keep in contact with the university laboratories in their field of interest.

More recently, universities have begun to open themselves up to the outside environment. They have developed inventories of external services and catalogues of their research activities and potential. Special intermediary services now are being provided by industrial liaison offices and interface departments or transfer points (Hull, 1990; Kuhlmann, 1991).

The pattern of university and industry interaction has evolved over time. Today there is an increase in the number of contacts between universities and industry. However, for consulting and data analysis activities, the industrial company usually takes the initiative.
to contact the professor, and for licensing and spin-offs, it is more common for the university to be the initiating partner.

The Innovation Process

Innovation is important to industry. The aim of the business world is to create wealth. Innovation leads to new products, new markets and to commercial and financial success. It is worthwhile to identify the steps that must be taken to move from the point of a great idea to a commercial success and to study the multiple hurdles that must be overcome.

Most successful innovations begin with an inventor with an idea. The inventor then works to develop the idea into something practical, in his or her garage, company or scientific laboratory. Next, the inventor tests the practical application of the idea and hopes for positive results. Further work leads to the development of a prototype.

However, the work is not finished. The prototype seldom satisfies. The prototype must be refined, and further study often has to be undertaken to overcome technical problems. This phase is generally called the development phase.

The final result is a pre-industrial product that meets technical specifications. The next step is further engineering to reduce the production price of the product. This is generally done during the scaling up phase. Once the technical problems have been resolved, production costs are acceptable and marketing research gives a positive signal, the product is launched in the marketplace.

The innovation process involves many interactions and feedback loops. At each step the cost of the process increases, as does the value of the project, or at least the potential value of the potential innovation. It is not uncommon for costs to increase more than expected in each phase.

Even if the first test of an idea can be executed within a reasonable budget, as in the case of an innovation tested in a garage, the process of moving an innovation from prototype to pre-industrial product to the phase of up scaling grows increasingly expensive. Moreover, to launch a product successfully in the marketplace requires a large budget.

It is important to see this evolution in costs related to the phases of the project over time. Costs rise exponentially, and so does the potential value of the project. But the success of the launch is not yet guaranteed. The literature on innovation has proven that many new products are not always transformed into successful commercial successes, even if they are technically superb. The key to the commercial success of any innovation is marketing.

Thus, success depends on both the technological advantages of the product as well as the market’s need for the product. It is good to have feedback from the market in the early phases of technology transfer, as the reaction of the market can lead to improvements and refinements that will increase the chances of the product’s ultimate success.

The academic’s tendency is to spend too much time in the laboratory trying to improve the prototype and find a perfect technical solution. Again, financial imperatives have to be considered, and time is an advantage in a competitive market. Continuing to improve the prototype will delay the launch, diminish the lead time and increase the risk that a competitor will be the first to market a similar product. It must be remembered that innovation does not stop with the launch. Continuous improvements lead to upgrades and a new time advantage to the competitors.

This means that the success of an innovation project can not be evaluated until the final step has been reached. At that time, the value of the project can be determined. The value of the project may have increased exponentially or decreased towards zero because of
technology transfer: information broker, science marketer and catalyst for academic entrepreneurs. The goal of these activities is to give the university a dynamic, practice oriented and high-technology image. The entrepreneurial university contributes to the social and economic growth of the region it serves, a crucial role in the university’s mission. The following section describes the specific contribution of the university-industry liaison office can make to this process.

Promoting University–Industry Interaction. Faculty members are organized in departments and colleges under broad academic areas. This structure makes it difficult for industry to identify someone with expertise in a particular area or someone to contact for help with a specific problem. Many universities have therefore established liaison offices to help outsiders navigate the university organization.

The role of the liaison office is to help people outside the university find one or more researchers with expertise in a specific area. Such information is centralized in the liaison office. The goal of the liaison office is to lower the entrance barrier for the external business world and to complement existing informal direct contacts between faculty and industrial representatives.

Thus, the role of the liaison office does not differ that much from the classic marketing manager’s function. Marketing is about communication and information and bringing people together, i.e. creating linkages. However, the marketing of the university R&D services means marketing professional
services (Kotler & Bloom, 1984). Therefore, the university-industry liaison office has a dual function: marketing outside the organization (the classical marketing), and marketing inside the organization.

**External Marketing.** The marketing of the university’s research potential is a new area for marketing that has only been discovered recently. It can be called ‘science marketing.’ It is paradoxical that universities that offer marketing as a management discipline in their business schools have been one of the last organizations to adopt it for their own purposes. Science marketing reinforces the university’s public image in the external world.

It is the responsibility of the liaison office to actively promote university services in the business community. This may include dissemination of brochures containing information on the university’s research strengths and organizing visits by corporate customers to university research labs as a way of highlighting university capabilities and facilitating personal contact between university and industry representatives. Personal contact is important, and it is always better to demonstrate one’s capabilities than to just talk about them.

During such meetings, industry representatives can learn what the university’s capabilities are; at the same time, scientists can learn what interests business people. Discussion can lead to new areas of common interest that would not have been covered in a less personal conversation.

However, many people from business and industry still view the university as an ivory tower that focuses on basic research and teaching without a great deal of interest in practical matters such as applied research. The marketing challenge for university-industry liaison offices is to overcome this outdated perception.

Towards this end, liaison offices can launch special initiatives that bring the university closer to the industrial world. Meetings between scientists, financiers and industry representatives improve the chances of finding common interests.

Liaison offices should use every opportunity to promote the activities of the university and build a strong service image for the university with potential customers. Use of the press and other media can facilitate this process. Regular articles in various specialized periodicals and coverage on television can focus attention on the university’s strengths. For many scientific discoveries that make the daily news, the press will be eager to interview a local researcher. In this sense, the university is a good product to sell.

**Internal Marketing.** The liaison office often has an even more difficult task than external marketing — internal marketing. It is sometimes difficult to convince university professors that marketing their expertise is wise or necessary. Conversely, some professors have the idea that because they are the best in their field, they also are brilliant in marketing their research.

The solution is to convince faculty that the liaison office has something to offer. Unfortunately, most liaison officers are not known within the university community. Marketing the liaison office helps create an image for the office, stimulates awareness of the services provided and creates awareness among potential customers, i.e., the faculty.

To market the liaison office effectively, it is necessary to overcome two barriers: the ever-present university bureaucracy and the fact that a liaison office is not an academic unit — which is a problem in a world where only an academic rank is valued. It is therefore important that a person who is known by everybody in the university and has an extensive network of contacts in and outside the university manage the liaison office.

The best marketing in business is a good success story. Similarly, the best internal marketing for the liaison office is a happy professor. It is not surprising that a university-industry liaison officer in the United States was considered very successful and received a great deal of recognition when one of the university professors he had helped with a patent became a millionaire and started driving a Ferrari.
The Role of Intermediary Organizations and Networks

Creating a university-industry liaison office at the university does not ensure that the outside world will know the university exists, and promotion is a very expensive activity. Universities cannot afford big advertisement campaigns. Most liaison offices have a limited budget and resources. Therefore, they typically must look for creative solutions. A strategy of developing alliances may be very effective.

People in industry first will seek advice from people they know. They may consult colleagues within their organization, or they might make external contacts with known consultants. Other external sources include people involved in intermediary organizations such as professional federations as well as private or governmental brokers active in technology transfer. Contact persons within an industrial company also can act as intermediaries. In other cases, university alumni can provide an introduction or be the contact person.

It is important for the liaison officer to know of possible referrals, because they will be able to create a link with potential customers that have no other access to the scientific community. Such intermediaries act as a channel for the dissemination of information. They also forward requests to the liaison officer because they know they will receive an answer that can help their customer or contact.

There also is a broad scale of different organizations that operate as brokers in the process of technology transfer. These brokers may have private or governmental status (e.g. regional development agencies). Brokers have their own network of contacts. They have access to databanks and can supply all kinds of information including catalogues, periodicals, etc. They often are present at technology fairs. The kind of service varies from organization to organization, as does the remuneration.

Besides these official and private brokers, there are other organizations that can act as brokers (systematically or fortuitously). Potential brokers include industry federations, alumni associations, professional associations, the local Chamber of Commerce, as well as banks, ministry cabinets and embassies. In Europe, some federations and regional development agencies have recently broadened their scope of activities to include dissemination of information and promotion of innovation, thanks to European Community support. The probability of contact increases thanks to all these intermediary associations.

Promoting Technology Transfer

One should never underestimate the distance between invention and commercial success or forget that few inventions lead to the success of the professor with the Ferrari described above. The difficult path to success is represented in Figure 1, with two triangles, the one with the base on top, the other one with the base down. The first represents the laborious path from idea to innovative success. For every thousand ideas, only one hundred becomes a prototype, and only 10 survive to the technical and industrialization phase to become a product ready to be launched. Only one will ever become a commercial success.

Since the risks are higher in the early stages of technology transfer, it is not always easy to obtain the important “down payment.” The liaison office can help in negotiating the best deal for the university. In many cases it will be a risk-sharing agreement with a royalty on future sales. In some cases — depending on the resources and the evolution of the entrepreneurial spirit of the university — it will be possible to take a higher risk and to participate in a spin-off company. The liaison office can take the initiative and help in writing the business plan.

The liaison officer also can advise researchers on intellectual property matters and patents (Ditzel, 1988) and assist the professor during negotiations with business and industry representatives. It is the liaison office’s responsibility to defend the university’s rights in negotiations with very experienced businessmen who may not always appreciate the university’s commitment to knowledge dissemination. Besides assistance
with marketing and negotiation, the liaison officer can facilitate the establishment of spin-off companies and research parks. Table 2 provides a comprehensive list of the activities of the university-industry liaison office.

Clearly, technology transfer is a risky business, and remains hard work. It requires patience. Here too, the liaison officer can provide an important service to the university community by conveying these truths to professors who possess unrealistic expectations. It is important that faculty members realize that making a successful business requires more than just a bright idea, and that success is often the result of the efforts of many people besides the inventor.

Similarly, there are many factors involved in profitable technology transfer. The university-industry liaison office clearly plays an important part in this process. The following strategies are associated with successful technology transfer programs.

**A Pro-Active Strategy.** Liaison officers should go and visit the business-industrial client, and not wait for the client to visit them, which is the classical approach of a bureaucracy. By making an on-site visit, the liaison officer can see the client’s laboratories and obtain greater awareness of the lab’s equipment and needs. More importantly, the liaison officer can meet the researchers who are working on projects. These researchers will then be able to put a face with the name of the liaison officer, and the liaison officer will no

Table 2: The Role of the University-Industry Liaison Office

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<tr>
<th>Dissemination of information</th>
<th>Fielding inquiries from industry</th>
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<td>Development and distribution of brochures</td>
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<td>Promoting networking opportunities</td>
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<tr>
<td>Marketing and promotional activities</td>
<td>Organizing visits to laboratories</td>
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<td>Participating in conferences, presentations</td>
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<tr>
<td>Public relations activities</td>
<td>Networking with professional associations, etc.</td>
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<tr>
<td>Adventure and help with negotiation of research contracts</td>
<td>Writing articles in periodicals and press</td>
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<td></td>
<td>Promoting special events</td>
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<tr>
<td>Active management of the valorization of the university potential</td>
<td>Advising professors on intellectual property and patent issues</td>
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<td></td>
<td>Helping with negotiations</td>
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<td></td>
<td>Defining strategy for technology transfer</td>
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<tr>
<td>Coordination of the university research park</td>
<td>Searching for industrial partners</td>
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<tr>
<td>Coordination of the university incubator center</td>
<td>Searching for commercial partners</td>
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<tr>
<td>Coordination of the university seed capital fund</td>
<td>Searching for financial partners (venture capital funds, business angels)</td>
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<td></td>
<td>Initiating spin off companies: helping with business plans</td>
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longer be an impersonal bureaucratic type somewhere in the administration building.

Networking. The liaison officer should build an internal network in the university organization. They should have at least one or two very close contacts with key people in every department. These people will keep them informed about what is happening in the department and, when necessary, encourage their colleagues to contact the liaison officer to report an invention.

As a result of networking, liaison officers often are the best-informed persons in the university. Furthermore, a well-informed liaison officer can facilitate collaboration among researchers working in different university laboratories. For example, if a researcher calls for advice, and the liaison officer gives the caller the name of a colleague in another department to contact, both researchers will be helped. By being helpful, the liaison officer adds value to the overall research enterprise.

Time Investment. It is impossible for the liaison officer to work for everybody at the same time. Liaison officers should be realistic and concentrate on no more than 10–20 projects at once. Select projects that will add value, and focus on professors who are willing to collaborate. Some professors already have a long tradition of working with industry. Within their area of interest, they may have better contacts than the liaison officer. Therefore, it is probably not necessary to invest a lot of time helping these faculty members. It may be a better use of the liaison officer’s time to interact with young researchers with potential. These young researchers are the academic stars of tomorrow. Alliances with researchers that are in the early stages of their careers may prove useful when these individuals later become chairpersons and deans of academic units.

Training Programs. Although liaison officers cannot work for everyone simultaneously, it is possible for the liaison officer to develop training programs that are designed to benefit everyone. For example, the liaison office could sponsor a course on “entrepreneurship,” or provide specific training sessions on patents, intellectual property, business planning, etc. If these opportunities are made available to the whole university community, the liaison officer will attract a broad constituency that is interested in obtaining information related to technology transfer. The liaison officer should plan to make follow-up visits to individuals attending these meetings.

Follow-Up. A good follow-up is necessary for all university-industry contacts that have been established by the liaison office. It is just human nature to forget to give decent feedback on the actions of others. Therefore, the liaison office should handle this service. If the liaison officer has given a name of a university researcher or laboratory to an industry representative, the liaison officer should follow up after one to two weeks.

If no action has been taken, the liaison officer should first contact the university laboratory and then the industrial partner. It may be that industry representatives have not been able to reach the researcher. The liaison officer can then offer to organize a meeting. It is important not to lose a potential customer who has already overcome the first barrier to collaboration by calling the university-industry liaison office.

After the initial meeting takes place, the liaison office should follow up again, one or two months later, first with the researcher, then with the industry representative. Follow-up will show the liaison officer cares about the potential project. It is also a way to learn how the customer is reacting to the service being provided by the university and if the researcher is comfortable with their role in the project. If problems are identified, the liaison officer can offer additional service and advice.

Collaboration and Alliances. Brokers can play an important role in encouraging technology transfer within their market segment. They can take the initiative to set up meetings, conferences, information sessions and visits to companies and laboratories. Collaboration between the liaison office and these brokers can lead to a win-win situation. For example, in organizing a visit to a lab for a group such as the Chamber of Commerce, the Chamber can do an internal mailing inviting its members to a special event. Then, only the liaison officer has to organize the program within the university.
Commitment from the Top. As with every important initiative, support and commitment from the top management of the university is essential to the success of the liaison office. Towards this end, the board of the university should approve an internal policy for intellectual property rights and for technology transfer. The university should give guidelines and also set up the necessary infrastructure for the implementation of the policy; define how far it wants to go in the innovation process; and create an entrepreneurial climate and organizational flexibility necessary to support technology transfer activities. This information should be distributed to all university staff. As in many marketing communication programs, this message should be repeated and enhanced from time to time.

Lessons Learned

Liaison offices are generally very limited in resources and staff. They cannot handle all jobs nor do all the work. Moreover, because of the decentralized aspect of most universities and the culture of academic freedom, professors may not appreciate the intervention of university central office staff.

We can derive two lessons from this. First, interaction between the university’s professors and liaison officers has to be voluntary. Faculty cannot be forced to work with liaison officers. To carry out their mission, liaison offices have to prove their usefulness to the university’s faculty. This is best accomplished through action rather than words. For faculty, the value of the liaison office is related to the quality of the advice the office staff provides in the areas of marketing, technology, defense of property rights, etc., and by the quality of the contacts the liaison office staff can create. With their advice on the best strategy for technology transfer and assistance to professors in the negotiations with industry, liaison offices create added value.

The second lesson is that the liaison office must be promoted internally. Many faculty members have a negative view of the bureaucracy that typically surrounds a university’s central administration. To succeed, the liaison office must counteract this image through internal marketing. This requires the commitment and support from the top management of the university.

Conclusion

Silicon Valley and Boston Route 128 are good examples of how technology transfer has mutually benefited industry and higher education. Stanford University, the Massachusetts Institute of Technology and Harvard University have all participated in this process. One of the best European examples is the Cambridge Science Park. More specialized examples also exist. The biotechnology firm, Plant Genetic Systems (PGS), has enhanced the image of the University of Ghent, which, as a result of its interaction with PGS, boasts biotech laboratories with an excellent worldwide reputation.

This type of reputation helps a university attract more research contracts, especially on the international scene, and indirectly, it helps the university attract students. It is usually the best students who are interested in a university with excellent laboratories. This undoubtedly gives the university a double financial advantage. However, it is not always possible to figure out the exact level of financial benefit.

The true impact of liaison offices on the technology transfer process also is difficult to measure quantitatively. The services provided by such offices tend to complement existing efforts. Moreover, the success of the liaison office is often the result of complex personal relationships that involve the whole scientific community.

In most European universities, liaison offices provide information, facilitate contact between and among university faculty and industry, and stimulate academic entrepreneurial behavior. Liaison officers provide advice, initiate the technology transfer process, help write business plans and help establish spin off companies and venture capital funds. The strategic value of the liaison office in European universities is increasing.

Successful universities in the 21st Century will have a center of gravity that is slightly oriented toward a new role: service to community. The ultimate criterion of success
will be the quality of the service a university provides. With their triple role of information broker, science marketer and catalyst for academic entrepreneurship, university-liaison offices can help universities respond to this challenge.

References
It’s Not Always “TGIF” in Sponsored Projects

Jenny Tomkins
Pamela Brown

In the research administration business, you quickly learn that to procrastinate is human, and that “if all else fails, read the guidelines” is an almost universal philosophy among neophyte proposal writers. The time you most often re-discover both these truths about human nature is on a Friday afternoon.

One quiet Friday afternoon at the end of the academic year, our Office of Sponsored Projects (OSP) was winding down for the weekend when the phone rang. On the line was a faculty member who had called to say that she planned to submit a grant proposal, something she had not done before. Fine, she’d come to the right place: it’s what we do and we’d be glad to help. “When is the deadline?” the OSP staff member (we’ll call her Jane) who took the call inquired. The faculty member wasn’t quite sure — “Some time next week,” she thought. “Well,” said Jane, “fax me a copy of guidelines so I can check them over and get back to you with any advice or comments I may have.”

The guidelines arrived a few minutes later, and as she glanced over them, Jane realized that she had only the front half of what must have originally been double-sided copy. Interestingly, though, somewhere in the faxed portion, she DID find the deadline. The receipt date for the proposal was the following Monday, which meant the proposal had to be mailed within the next 90 minutes! By the end of the afternoon there would be a budget to create, internal forms to draw up, the narrative to be checked, approvals from grants accountants and other administrators to secure, a signature from the university’s authorized official to obtain, a cover page and cover letter to draft and sundry other tasks detailed in the guidelines to perform.

Jane called the faculty member to share the news. Then she called the funding agency to double-check the deadline date and request side-two of the guidelines, intrigued at the prospect of more surprises to come. From her conversation with the faculty member, Jane learned that the faculty member herself had discovered from her department chair only the previous day that she was expected to write the proposal.

Meanwhile, this tyro PI was also talking with one of our office’s budget development staff (we’ll call him Patrick). Patrick learned
that not one, but TWO faculty members were in the process of writing this 11th-hour proposal; one was doing the budget, the other the narrative. To make things really interesting, neither was on campus and each was at a separate off-campus location. For the rest of the afternoon, a maelstrom of crossed phone calls and e-mails was to ensue...

While Jane was checking through all the requirements in the guidelines, Patrick was in touch with the second faculty member — who it turned out was to be the project director — to request a draft budget. By 3:00 p.m., there was still no sign of a budget outline. He called and e-mailed. By 3:35 p.m., the first draft budget arrived. A quick calculation showed that this draft would produce a budget that was double the maximum amount allowed by the guidelines. For the next hour, he tried to reach both faculty members to notify them of the problem and suggest cuts to the budget. Neither could be reached to make changes, so by 4:30 p.m. Patrick realized that the inflated budget would have to be submitted “as is.”

Meanwhile, Jane was obtaining, editing and assembling all the other “ingredients” called for in the guidelines: curricula vitae, references and background information on the capability of the institution. When the narrative itself finally arrived by e-mail, it was clear that it had been assembled from pre-existing materials and did not follow the order or content requirements in the guidelines. But by now it was too late to edit it and impossible to contact the faculty member to let her know that changes were needed.

Oh, well, at least we were by now familiar enough with the application materials to know that our novice PI had not mentioned undertaking a capital improvement project with grant monies and that our budget did not violate state or university regulations. In other words, we were able to perform some oversight functions, even with this catastrophe-waiting-to-happen. So, our secretary set to work typing FedEx labels and copying the materials. With the combined efforts of four staff members, a very lackluster proposal left the office at 4:50 p.m. on Friday, just in time to catch the last FedEx collection at 5:00 p.m. The following Monday, we obtained permission to submit a revised budget.

Of course, the proposal was not funded; a revised budget was merely cosmetic. Indeed, it’s hard to bring to mind any proposal put together at such short notice that has been funded — unless it had been “wired” at the start.

Yet, all was not entirely lost. The PI came to our office the following week, thanked OSP staff profusely, and asked how she could do better next time. Ah, music to our ears! And we were ready for her with the OSP mantra: “Let us know in plenty of time when you are going to write a proposal so we can give you the maximum help possible.” Not to mention, of course, “Read the guidelines...”

Wishing you stress-free Fridays in the afterlife — you certainly won’t get them in Sponsored Projects!

Note: The authors and “Patrick” wish to assure you this article is based on a true story.
Commentary

Modular Grants: From Puzzle to Paradigm

Robert Stoddard

Panic! Adjustment. Relief. This sequence of reactions describes how many of us in the health science community have responded to the Modular Grants Initiative (MGI) introduced by NIH just over a year ago. Since that time, grantee institutions have had to learn to function without the familiar format and comforting details of the old NIH detailed budget page. Somehow we have made the adjustment, knowing in our hearts that there wasn’t much we could do about it.

Through the MGI, the NIH has introduced the concept of “modularism,” and we are in need of a new paradigm to help us understand how the investigator, the department administrator, the institutional policy maker and the auditor need to interact in the sometimes puzzling, brave new world of modular grants. I would therefore like to offer a paradigm, based on the structure of the Rubik’s Cube, as a possible solution.

An advertisement for the Rubik’s Cube reads, “Billions of combinations, only one solution.” The puzzle is solved when the segments of the cube are arranged so that each side of the cube is a solid color. In my opinion, the Rubik’s Cube is a perfect model for the relationships that exist in the sponsored research world.

In this model, each color of the cube corresponds to one of the groups involved in this institutional paradigm: the faculty investigator, the departmental administrator, the institutional policy maker, the NIH, the federal government, and, of course, the auditor. Because I am writing from an institutional perspective, I will limit my discussion to those sides of the cube most applicable to grantees and save my thoughts about NIH and the federal government for another article.

First, let us assume that all the green squares on the cube represent investigators submitting R01’s under the MGI. I happen to work with 40 or so of these investigators at the University of California, Los Angeles (UCLA), and I’m sure you won’t be surprised to learn that before modular grants, each of these PI’s had their own way of preparing a detailed NIH budget. During the first year of the MGI, things have not changed. PI’s still use a variety of approaches to developing modular budgets. (I also am sure that quite a few of these PI’s continue to close their eyes and make up their budget numbers.)

I understand from our Sponsored Research (SR) Office that many of the faculty members that attended the first UCLA workshop on the MGI were positively terrified at the thought of modular grant budgets. They felt totally unprepared to assume the responsibility for foreign sounding concepts like exclusions, verification of F&A cost calculations and sound financial planning. This alarmed our SR folks causing them to seriously consider imposing a whole new level of budget requirements to ensure that investigators would meet their responsibilities.

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Other institutions have had similar experiences, as these quotes taken from university Web sites across the country imply:

• The University of Wisconsin: “In order to verify that we are following cost accounting standards, the Medical School will continue to require a customary budget prepared in sufficient detail to allow for a meaningful review…” (Medical School Procedures for NIH Modular Grant Applications, www.rsp.wisc.edu/pre-award/MSModularProposals.htm)

• The University of Indiana: “A simplified budget, including the following categories, should be submitted with the proposal…” (Important Notice #99-4, www.fms.indiana.edu/cgi/imp_notice/99-4.html)

• The University of Chicago: “The review of MG will be quite similar to the current practice and internal budgets will still be required.” (Memorandum from Director Judith K. Argon 4/20/99, http://ors.bsd.uchicago.edu/FGPA/)

Obviously, even though the intent of the MGI is to streamline, reinvent and to make the grantees’ jobs easier, institutions don’t seem to be totally ready to accept this process. They want assurances that modular budgets are being prepared correctly, and they’re not convinced that the absence of a well-developed budget won’t hurt their defense should they be audited. There may be some reason for their hesitancy. Here are some fairly common patterns that I have noticed during my 10 years of assisting investigators with their proposal budgets:

• Budgets are mostly “guesstimates” even when the details are required. I should know; I’ve done my share of making up the details

• The most common method of arriving at these guesstimates is for the PI to work backward from a total he/she feels is appropriate for the research proposed or that will satisfy the study section.

• Excluding the category of key personnel, the category PI’s usually think through the most (possibly because it affects their salaries?), actual spending on an award often bears no relationship to the detailed budget proposed. Even salary projections can be inaccurate, since these are often based on generous official calculations to account for cost of living and merit increases that may not occur.

• Finally, there is this maxim:
  No matter the award, large or small, Investigators will spend it ALL.

These patterns of behavior suggest that, for the PI, developing a budget is more of a rough calculation than a well thought out plan. Thus, the MGI reflects more of what the PI’s already are doing when they develop a project budget.

Tensions over F&A cost assumptions and potential audit problems are primarily what have the institutional policy makers up in arms. They are concerned that PI’s can’t be trusted to accurately calculate the F&A costs without the details of an actual budget. However, I question whether or not the PI’s can be trusted to calculate F&A costs correctly with an actual budget! Furthermore, if PI’s only make up their direct costs, why make all this fuss over F&A integrity?

In my opinion, modular grants simply allow PI’s to develop budgets the way they always have done; only now, they aren’t forced to pretend the numbers are based on reality. However, the lack of something in writing — genuine or not — has lead many institutions of higher education to take steps to protect themselves from their own faculty. Is such intervention necessary, or are back-up budgets, watchdog personnel, SR review teams and the services of pre-award administrators simply obstacles to streamlining? Well, when you twist the Rubik’s Cube, the one sure thing is that the cube always move uncomfortably close to the other colors on their way towards the solution.

In my department, the buffer between investigators and institutional types is the department administrator (DA). The department administrator has two separate functions, pre-award and post award. The new modular grant budget justification page is one of the primary pre-award tasks because of the financial ripple effect it creates down the life of an award.
Someone in this group is usually responsible for helping with the budgets and assuming the role of watchdog over proposal preparation. Let’s use the yellow cubes to represent this group. (This work causes these personnel turn yellow pretty quickly.) This group may include secretaries — when the PI can afford it — as well as pre-award and post-award administrators.

In many cases, the required review in the SR office is really a double check of a DA’s work on behalf of the PI. In other cases, the SR office at UCLA serves this function. However, the DA has a vested interest in ensuring the accuracy of the work he or she does for a PI. Mistakes have a tendency to boomerang back to the department, sloppy work can be identified and corrected, and administrators can be fired or enshrined. (My faculty are so thrilled that I’m willing to go to prison for them that they work overtime trying to find new ways of committing fraud just so I can approve them!)

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In keeping with the spirit of this streamlined proposal submission initiative, OSR no longer requires a detailed budget. In the absence of a detailed budget, OSR review of modular proposals will be limited and will not include review of indirect costs to assure they are correctly calculated. The Principal Investigator and departmental staff will be solely responsible for ensuring that sufficient funds are requested and that indirect costs
are accurately calculated for all modular grant proposal submissions. (NIH Modular Grants at UCLA, www.research.ucla.edu/sr2/ModAdmin.htm)

I believe in my heart that investigators can be reasonably accurate about F&A calculations, especially when they receive assistance from a departmental pre-award administrator. Furthermore, most post-award institutional financial systems are designed to accommodate adjustments to these costs.

At UCLA, when investigators re-budget from supplies into equipment, for example, the overhead category is charged the appropriate deduction and the extra money moves into the unallocated category. If an investigator error in the original NIH budget proposal underestimates the F&A, a reverse charge can be made at the expense of the direct costs total. After all, hitting a PI in the pocketbook is probably the best lesson of all.

What is all this teaching us? Maybe nothing. What is certain is that as we twist the cube, thinking that we are getting closer to the solution, the interactions just grow more and more complicated.

Some post-award administrators are concerned that without a budget to guide them, the costs charged to the award won’t be appropriately monitored. Perhaps such worrying is premature. For example, when a NIH award is received at UCLA, the money is placed as a lump sum in a new account in the investigator’s department. Charges against the account accrue over the life of the award and are moved by the DA into the various sub account categories. When the account is closed out, a final reconciliation occurs. This process is no different with a modular grant than with any other form of award.

However, with the absence of a detailed budget, post award administrators will have less guidance on how to approve spending. To compensate, more and more of our department administrators are clamoring to join SRA and NCURA looking for handouts and guidebooks. They pour over OMB Circulars and rattle off session titles in their sleep. At this rate, there won’t be any department administrators left at UCLA. They will have all turned into Sponsored Research Administrators. What an ironic twist of the cube! And whom will the investigators turn to then?

Unfortunately, it won’t be the red-cubed policymakers. Investigators hate policy makers because policymakers want everybody to follow policies, and they’ll make up new policies just to keep their old policies company, so that their policy books always look big and fat. UCLA probably has hefty policy books going all the way back to the Magna Carta!

Investigators hate policies even more than policymakers. The good thing about the modular grants initiative is that it provides institutions the opportunity to review their policies on behalf of their investigators. The bad thing is that policymaker’s just love to review old policies because it justifies making new policies.

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At issue is how to streamline the award process yet maintain internal management control of awards. At some institutions, this is turning into a battle, with everyone having a different reaction to the MGI. As we near the end of the first year, no winner has yet been declared. However, the lines have been drawn, and everybody is being forced to adjust.

In the meantime, there is evidence of change. In the minutes of the Faculty/Agency Luncheon Discussion, FDP Steering Committee (www.aecom.yu.edu/ogs/modgrdis.htm), Richard Seligman from Cal Tech says that, “it would be suicidal to impose a budget requirement on NIH applications if the NIH is not going to do it,” and that he’s willing “to live with scaled-down budgets from PI’s to include only a listing of indirect cost exclu-
sions and fight the auditors on it.” At the same meeting, Julie Norris from MIT points out that, “the fears being expressed by many institutions over modular grants are similar to earlier fears about moving away from prior-approval and no-cost extension paperwork.” She indicates that getting the trivia out of the system “will allow quality support to faculty doing research proposals.” Now that’s what faculty members like to hear!

But are sympathetic words enough to survive a white cube attack? Just one is enough to cause a lot of trouble. I am talking about “Them,” the auditors. An auditor’s main interest is not quality research. Their bottom line isn’t a cure; it’s a big, fat, zero-balance. We must never forget that the white cube auditors are “out there,” waiting. Waiting for our grants to end. Waiting for the years to add up, so they can probe and discover how un-standard our cost accounting standards really are.

What will they be looking for when a modular grant gets caught in their audit net? Only time will tell. But realistically, modular grants won’t be flying flags that are any redder than any other type of grant. Therefore, instead of a lengthy discussion about audit trails, I suggest the reader consult this journal as well as others for advice and counsel.

The Rubik’s Cube has been called “the perfect puzzle” and the “best puzzle ever.” With a few turns you can mix up its small colored cubes. Billions of combinations! Only one solution! However, to solve the puzzle, you have to match the cubes to make every side a solid color. The auditors would like that, every side of the cube a different color, neat, precise and solved.

Our modular grants Rubik’s Cube paradigm is not so tidy. Ours is not the perfect puzzle. In fact, we may not want our cubes to match up to form solid colors on each side of the cube. Maybe a better solution is to make every side a pattern of colors: Billions of combinations! Billions of solutions!

The goal of providing quality support to our investigators is sometimes lost in the flurry of rules, regulations and paperwork. Policies we create to protect faculty also create bureaucracies. Bureaucrats often lose sight of their allegiance to faculty and serve their bureaucracies. As we twist and turn our modular grant cube, growing more and more frustrated with the complexities we create, we are suddenly forced into dizzying contact with many different colleagues. We can and must reinvent our relationships.

In our sponsored research world, investigators must co-exist with institutional officers, share their expertise with department administrators and adapt to the needs of both investigators and the institution. All must follow the guidelines dictated by the granting agencies such as NIH, and take into consideration all applicable federal rules and regulations.

Pick your favorite color. Work your solution. Always remember that all the cubes are vibrant and alive and ready to join together. But, never forget that the puzzle is about scientists carrying out research, and the only meaningful solution is to make that happen.
Information for Contributors

I. Topics of Interest

The Journal of Research Administration publishes a variety of articles intended to expand the knowledge and tools of research administration. Manuscripts are solicited on topics such as the role of the administrator (e.g., aspects of professional training, responsibilities, and career advancement); methods to improve administrative management; issues of compliance; higher education-industry partnerships; use of new technology; techniques to enhance the management of research; long-range planning strategies; procedures which stimulate faculty interest in research; and other timely subjects that will be of interest to research administrators employed in the public or private sectors. Contributors need not be a member of SRA to submit an article to the Journal.

The Journal of Research Administration offers contributors several methods for presenting their subject matter:

- **Research papers** allow research administrators to report the results of original research. Articles should reflect the stages of the research process and be organized into distinct sections (i.e., introduction, materials and method, results, conclusions, cited references, acknowledgments, tables and figures—see “Style” below).

- **Theoretical articles** draw upon the existing research literature to advance a theory in any area related to research development and/or administration.

- **Scholarly critiques** organize, integrate, and evaluate previously published information on research development and administration. Authors should identify contradictions, gaps, and inconsistencies in this body of knowledge and recommend the next step or steps needed to resolve the identified problem(s).

- **Commentary articles** present an author’s point of view on a topic related to the development and/or administration of the research enterprise. The author’s position is supported by literature citations, data and/or examples from personal experience.

- **Case studies** provide background information on a problem or issue related to research development and/or administration and describe how this problem or issue has been resolved within a particular organization.

- **Reaction papers** are articles in which the author responds to an article previously published in the Journal. Such articles may be initiated from the field or invited by the editor. The author of the original manuscript will always be given an opportunity to reply.

- **Brief reports** are concise descriptions of innovative techniques, procedures, or policies that would be of interest to other research administrators. Brief reports are limited to no more than 410 lines of 60-space text.

- **Review articles** evaluate books, films, and other media relevant to the field of research administration.

- **Other articles** may include edited transcripts of roundtable discussions that focus on topics of interest to research administrators; articles based on interviews with key policy-makers; or other forms of written expression deemed appropriate to the mission of the Journal by the editor in consultation with the Editorial Review Board.

Except under unusual circumstances, The Journal of Research Administration does not accept manuscripts that have been published elsewhere, or that will be published prior to appearing in The Journal of Research Administration. Authors are reminded to inform the editor of such matters at the time a manuscript is submitted.
II. Style

The Journal of Research Administration has adopted the publication style manual of the American Psychological Association as the guide to follow when submitting manuscripts.* When appropriate, articles should be organized according to the following format:

• **Title Page.** Please include the title of the manuscript, name of author(s) with current title(s) and institutional affiliation(s) and complete mailing address for correspondence, including telephone, fax and e-mail (if applicable). Articles based on presentations should be identified as such on the title page.

• **Abstract.** Each manuscript should be prefaced with an abstract of 100-200 words summarizing the topic and principal conclusions.

• **Introduction.** This portion should thoroughly chronicle the past history of the subject under discussion with appropriate use of references from the literature. Use of reference materials is very often an integral part of an accepted manuscript.

• **Materials and Methods.** This section should identify the procedures and techniques used to conduct the study (e.g., type of survey employed).

• **Results.** This part should summarize the results achieved as a direct consequence of the techniques/methods used in the study.

• **Conclusions.** This section should provide a concise summary of the study and any future or practical implications for the use of the results achieved.

• **Cited References.** References should be cited alphabetically and listed together in a uniform manner at the end of the manuscript. Footnotes should be avoided. Articles and books should be cited as follows:

  * **Journal Article (single author):**

  * **Journal Article (multiple authors):**

  * **Book (single author):**

  * **Book (multiple authors):**

III. Text Format

All manuscripts should be submitted (including all tables and figures) in double-spaced, typewritten copy without page numbers (although all tables and figures should be numbered consecutively—see “Graphics” below).

Length

While the Journal realizes that different subjects will require treatments of different lengths, authors should attempt to keep manuscripts to fewer than 2,000 words (approximately ten 8-1/2 x 11 manuscript pages, double-spaced).

Electronic Submission

When possible, all manuscripts should also be submitted to the editor via an E-mail attachment. MS Word (version 6.0 or higher) and WordPerfect (version 5.0 or higher) are optimal, but the publisher can translate text from other softwares as well.

Table 1: Function Descriptions

Sixty-nine activities were grouped into the 12 functions in the Physics Department study.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACAD</td>
<td>Academic support, faculty and student affairs, teaching. Not research.</td>
</tr>
<tr>
<td>ACCT</td>
<td>Financial accounting functions, especially bookkeeping and reporting.</td>
</tr>
<tr>
<td>FAC</td>
<td>Facilities maintenance of common physical plant. Not specific-use areas like classrooms or research laboratories.</td>
</tr>
<tr>
<td>FIN</td>
<td>Financial management. Includes departmental level and individual management of assigned budgets.</td>
</tr>
<tr>
<td>GEN</td>
<td>General. Functions any employee might perform, simply by being an employee.</td>
</tr>
<tr>
<td>OSS</td>
<td>Office support and supervision. Administrative office functions.</td>
</tr>
<tr>
<td>PAMS</td>
<td>Purchasing and Material Support. Buying, contracting, and associated activities, including gasses and stockroom operations.</td>
</tr>
<tr>
<td>PAY</td>
<td>Payroll. Setting up payroll, managing payroll records. Distribution of pay.</td>
</tr>
<tr>
<td>RA</td>
<td>Research Administration. Pre-award and post-award procedures other than bookkeeping.</td>
</tr>
<tr>
<td>RSF</td>
<td>Research Support Functions. Direct technical support of research, e.g., electronics, repairs, and manufacturing.</td>
</tr>
<tr>
<td>TVL</td>
<td>Travel. Administration of travel program (not travel expenses themselves).</td>
</tr>
<tr>
<td>INT</td>
<td>Internal Controls, e.g., cash controls, auditing, and back-up activities.</td>
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</tbody>
</table>

**Typeface**

Twelve-point Times and Times-Bold typefaces are most easily translated, though the publisher can translate other fonts. Please refrain from customizing manuscript text with stylized fonts or formats, such as small caps, larger or smaller point sizes, unusual tab settings or altered margins.

**IV. Graphics**

Tables should be numbered consecutively in the order in which they are introduced in the text, using Arabic numerals preceded by the word “Table.” Identify each figure, drawing, illustration, chart or graph consecutively by number (using Arabic numerals) preceded by the word “Figure.” Include reference copies of each graphic. The typeface of text in any table or figure should match that of the manuscript text (see “Typeface” above).

**Standard Graphics**

When possible, simple text-based tables and figures (see Table 1) should be submitted in a standard word processing language. Each table or figure should be assigned a separate filename from that of the manuscript. Alternatively, submit graphics in a camera-ready format as an original black-and-white negative or glossy print only (print-outs on standard paper are usually acceptable, though quality is diminished upon reproduction). Lettering should be uniform and large enough to be legible after reduction of up to 50 percent.

**Complex Graphics**

Complex figures, such as those using overlapping screens, patterns or shading (see Figure 2), should be submitted in a Mac or IBM TIF format. Alternatively, submit the graphic in a camera-ready format as an original black-and-white negative or glossy print. Complex graphics printed or photocopied on standard paper are usually not accepted. Lettering should be uniform and large enough to be legible after reduction of up to 50 percent.

Note: The publisher reserves the right to deny publication of graphics that do not reproduce clearly in *The Journal of Research Administration*.

**V. Editorial Review Process**

Each manuscript submitted to *The Journal of Research Administration* will be reviewed by the members of the Editorial Review Board. Authors will be notified of the status
of their manuscripts as soon as a decision has been reached. Prior to publication, authors of original manuscripts will be required to sign a copyright registration form. Original manuscripts cannot be published unless this copyright form is signed by the author(s).

Manuscripts and letters-to-the-editor should be sent to Dr. Pamela F. Miller, Director, Office of Research and Sponsored Programs, The University of Southern Mississippi, Box 5157, Hattiesburg, MS 39406-5157; E-mail: Pam.Miller@usm.edu.

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