
10-7-2019

Sponsored Research Indirect Costs: A Single-Site Case Study of Public Research University STEM Faculty Members' Perspectives

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Recommended APA Citation

Gossman, S. (2019). Sponsored Research Indirect Costs: A Single-Site Case Study of Public Research University STEM Faculty Members' Perspectives. *The Qualitative Report*, 24(10), 2402-2425.
<https://doi.org/10.46743/2160-3715/2019.3832>

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Abstract

This explanatory case study investigated the phenomenon of one institution's public research university STEM (science, technology, engineering and mathematics) faculty members' perspectives on indirect cost recovery from research grant funding. The explanatory scheme incorporated organizational culture, faculty socialization, and political bargaining models in the conceptual framework. The analysis indicated that faculty socialization and organizational culture were the most dominant themes; political bargaining emerged as significantly less prominent. Public research university STEM faculty are most concerned about the survival of their research programs and the discovery facilitated by their research programs; they resort to conjecture regarding the utility of indirect cost recovery. The findings direct institutional administrators to consider less emphasis on compliance and hierarchical authority and focus on greater communication and clarity in budget processes and organizational decision-making when working with expert professionals such as science faculty; for higher education researchers, the findings indicate a need for more sophisticated models to understand organizational dependency on expert professionals.

Keywords

Higher Education Organizational Culture, STEM Faculty Socialization, Grant Funding, Managerialism, Single Site Case Study

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Sponsored Research Indirect Costs: A Single-Site Case Study of Public Research University STEM Faculty Members' Perspectives

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This explanatory case study investigated the phenomenon of one institution's public research university STEM (science, technology, engineering and mathematics) faculty members' perspectives on indirect cost recovery from research grant funding. The explanatory scheme incorporated organizational culture, faculty socialization, and political bargaining models in the conceptual framework. The analysis indicated that faculty socialization and organizational culture were the most dominant themes; political bargaining emerged as significantly less prominent. Public research university STEM faculty are most concerned about the survival of their research programs and the discovery facilitated by their research programs; they resort to conjecture regarding the utility of indirect cost recovery. The findings direct institutional administrators to consider less emphasis on compliance and hierarchical authority and focus on greater communication and clarity in budget processes and organizational decision-making when working with expert professionals such as science faculty; for higher education researchers, the findings indicate a need for more sophisticated models to understand organizational dependency on expert professionals. Keywords: Higher Education Organizational Culture, STEM Faculty Socialization, Grant Funding, Managerialism, Single Site Case Study

Purpose of Study

Higher education institutions are knowledge-creating, knowledge-disseminating enterprises. Basic research, also called fundamental or pure research, is driven by curiosity and interest in a scientific question. It is the lifeblood of knowledge creation and scientific inquiry. Basic research in science, technology, engineering and mathematics (STEM) has provided the knowledge undergirding applied research advances of the past 50 years, including vaccines, cancer therapies, global positioning systems and the world wide web (National Research Council, 2014). Public and private universities conduct 60 percent of all basic research in the United States. Federal government laboratories and non-profit and corporate research institutes conduct the remainder (National Science Foundation, National Center for Science and Engineering Statistics [NCSES], 2016).

More than half the funding for basic research at U.S. research universities is from the United States federal government, of which 80% is for the STEM fields. Higher education institutions themselves fund 20% of basic research out of their own internal resources. The balance of basic research funding comes from state governments, non-profit foundations, and corporate entities (NCSES, 2016). Faculty at research universities serve as the principal investigators who propose the research projects to sponsoring agencies, and who then manage the project and the grant funds on behalf of the university once an award is made to the institution.

Indirect cost recovery is the reimbursement of overhead costs incurred while conducting research for the federal government and other sponsors. Overhead costs include all

the basic facilities and administrative infrastructure to run an organization, such as utilities, maintenance, payroll and purchasing. For nearly 60 years, American research universities, both public and private, have negotiated agreements with the federal government authorizing each research institution's rate of indirect cost recovery. As state government appropriations for higher education have shrunk and tuition revenue is frequently capped, public research universities are increasingly financially dependent on external sponsored research support and its related indirect cost recovery. At major public research universities, on average, sponsored research represents 25% of revenue support (typically 60 to 80 percent federally funded), with the remainder of revenue coming from tuition (23%) and state appropriations (17%). Auxiliary enterprises (such as bookstores) at 17% and private gifts at 11%, along with a mix of other revenues at 7%, make up the balance (Council on Government Relations [COGR], 2014). Funding for basic research operations is not solely a concern in the United States, as the European Union also notes the problem of inadequate overhead cost recovery for research programs (European Commission, 2016; The Royal Society, 2015).

During the past 20 years the effective, or actual, rate of indirect cost recovery has been roughly half the negotiated rate (COGR, 2014). This difference translates into billions in annual lost revenue for institutions of higher education. The National Science Foundation reported public research universities lost \$3.4 billion in unrecovered indirect costs in fiscal year 2015 (NCSES, 2016). Most of the under-recovery is the result of sponsor-imposed restrictions on the allowable percentage of indirect cost recovery that can be applied to research funding, such as legislatively mandated caps on recovery incorporated in appropriations and statutory language; exclusions mandated in the federal Office of Management and Budget (2014) Uniform Guidance for Grants and Agreements, such as the prohibition on applying indirect costs to tuition or fellowships and the cap on administrative costs; non-federal entity restrictions on indirect cost recovery, typically seen with state government and non-profit sponsors; and internal institutional waivers on indirect costs requested by faculty for individual projects.

In addition, as indirect recovery is dependent on expenditures, annual recovery can be limited by under-spending on award budgets. An institution with a 50% indirect cost rate will recover \$25,000 for every \$50,000 of sponsored research direct costs spent. But that recovery only happens as expenditures are debited against the sponsored research account; indirect cost recovery is an after-the-fact charge. If the principal investigator only spends \$25,000 on his project, then only \$12,500 will be reimbursed from the sponsor for indirect costs. This underspending makes forecasting actual recovery difficult from year to year.

Role of the Principal Investigator in Indirect Cost Recovery

The need for full reimbursement of research costs dominates research funding discussions between higher education associations, research university presidents and federal funding agencies. One key participant's voice, however, is rarely represented in these discussions. Faculty, the principal investigators who design, conduct and report on sponsored research projects, are invoked primarily when compliance is the issue, whether it is compliance with research integrity policy, with indirect cost policy, with conflict of interest policy, with human subjects protocol policy, or with post award management policy. At the institutional level, concern over indirect cost under-recovery focuses on faculty compliance with indirect cost policy on their proposals.

The fact that individual institutions pressure faculty rather than sponsors over indirect cost under-recovery is not surprising. The federal government is not a simple entity to negotiate with over the costs of conducting research projects. Individual institutions spend years on space surveys and consultants to negotiate their facilities and administrative (indirect) costs rate

agreement with their cognizant federal agency. The agency's role is to ensure no profit is obtained from federal assistance awards. The dominant federal cognizant agencies are the Department of Health and Human Services and the Office of Naval Research, who between them negotiate indirect cost rate agreements with more than 90 percent of research universities. Despite the existence of those agreements, each of the 26 federal agencies that award research funding frequently add their own restrictions on indirect cost recovery to their awards, based on specific appropriations language or other stipulations. It is extremely difficult for any one institution to successfully protest an indirect cost restriction coming from an awarding agency. Research universities defer that battle to their lobbyists and associations in hopes those entities can whittle away at the federal cost containment imperative that drives federal indirect cost restrictions. The same can be said of non-federal sponsors, from state agencies to private foundations. Indirect costs are less important to a sponsor than the direct costs necessary to conduct the research; consequently, when funding agency budgets are squeezed, indirect costs are a convenient target for reduction of expenses on any particular sponsored research project (Kaiser, 2017).

Consequently, institutions pay attention to the actions of principal investigators with regard to indirect cost recovery. If a non-standard indirect cost rate is applied to a proposal budget, the faculty member must either prove the sponsor mandates that restriction or request an internal waiver of indirect costs. If neither occurs the faculty member must revise the project budget to accommodate full indirect cost recovery. In the research administration field, faculty members are frequently seen as resistant to accommodating indirect costs on their budgets. My pilot study of the site institution's data for fiscal year 2011 indicated that 18% of reduced indirect cost recovery on federal awards was due to faculty waiver requests.

The purpose of this subsequent case study at the site institution was to illuminate the perspectives of public research university STEM faculty regarding indirect cost recovery, and to explain faculty behavior towards the application of indirect costs on sponsored research projects. This study was an attempt to begin to understand the differing perspectives between faculty and administrators over the necessity of indirect cost recovery. Competition for research funding has intensified dramatically over the course of the past 20 years (National Research Council, 2014), grant proposal success rates have declined (National Institutes of Health, 2012), and a dwindling set of tenured and tenure-track research faculty find their research programs under greater pressure to perform with fewer resources, resources that might be supplied by increased indirect cost recovery (National Science Board, 2012).

Conceptual Synthesis

The assumption in this study was that a complex set of constructs may explain the faculty response to indirect cost recovery. These constructs are derived from three conceptual streams: organizational culture, faculty socialization, and political bargaining. Using a qualitative approach, this explanatory case study sought to understand the public research university STEM faculty perspective on indirect cost recovery from sponsored research.

The primary research questions were: What is the public research university STEM faculty understanding of indirect costs? What is the public research university STEM faculty behavior toward indirect costs? These primary research questions reflect the science of anthropology and its ethnographic approach, which looks to reveal human culture. Culture, as defined by Spradley (1979), is "the acquired knowledge that people use to interpret experience and generate social behavior" (p. 5). In this case study, public research university STEM faculty are the informants and guides, and their own words illuminate their interpretation of, and their actions toward, the phenomenon of indirect cost recovery on their sponsored research funding.

Cultural Anthropological Theory

This case study drew on a theoretical and conceptual framework grounded in the anthropological tradition. Cultural anthropological theory posits that human culture is constructed in response to the realities of the environment and the need to survive. Cultural anthropologist Marvin Harris states, “Human social life is a response to the practical problems of human existence” (2001, p. x). In essence, humankind has adapted to the world around it, not by biological changes, but by creating symbolic systems, such as language, kinship, religion, and art, and through the use of technology, such as irrigation, tool-making, writing, and transportation.

Cultural anthropologist Clifford Geertz advances the importance of understanding symbolic systems and emphasizes that the meaning of the social world and physical world are expressed throughout a culture in complex, interwoven and subtle ways which anthropologists seek to understand and interpret. For Harris and Geertz, the concept of culture encompasses both the symbolic systems expressing values, beliefs, and attitudes, and the social interactions and behaviors that are informed by those symbolic systems.

Tierney’s use of anthropological theory.

One of the few researchers using a cultural anthropological perspective to understand the modern complex organization of higher education is Tierney (2008). Tierney discusses the issues of tenure and promotion, student retention, and academic governance within the organizational culture framework he has developed for understanding higher education institutions. This framework contains six elements of higher education organizational culture: external environment, mission, socialization, information, strategy, and leadership.

Although he characterizes his framework as a set of operative cultural concepts, it is difficult to ascertain how these terms or elements interact. Instead he arrays them as avenues for investigation, whose weight and importance will vary by the specific institution (Tierney, 2008, p. 29). For the purposes of this study these elements are restructured in order to clarify how these cultural concepts function together and to uncover how they operate. I created a conceptual framework incorporating organizational culture as the context, professional socialization as the source of values or ideology, and political bargaining as the decision-making process. These elements interact through a set of key factors that may explain research faculty response to indirect cost recovery on their sponsored research projects.

Organizational Culture in Higher Education

For the purposes of this study, organizational culture in higher education is characterized as context, so as to more fully describe and delimit the world in which this phenomena is occurring. In this case, the particular organizational culture of the public research university involved in the study is seen as the complex context incorporating institutional structures, administrative processes, and procedural responses to external and internal environmental pressures and demands. This notion of *context* is the first construct of the conceptual framework. This concept connects not only to anthropological theory and Tierney’s framework, but also to bodies of literature exploring organizational culture.

Over the past century organizational culture studies emerged in the fields of sociology, political science, economics and management. Several approaches have dominated organizational culture studies overall, as well as organizational culture in higher education studies. One of the most significant approaches is *resource dependency theory*. Resource dependency theory, as presented by Pfeffer and Salancik (2003), offers a powerful view of

organizations as entities continually trapped in the flux of external forces that frequently constrict or deny critical resources necessary for the organization's survival. Given the uncertainties of this position, organizations seek many avenues to reduce or mitigate their dependency on these external agents. One key strategy is to enact inter-institutional agreements that codify the relationship between interdependent entities and thereby reduce uncertainty (p. 40). Another strategy is to constantly seek alternative resources, which once in place also offer respite from uncertainty (p. 46). The existence of negotiated rate agreements between research universities and the federal government is an example of inter-institutional, interdependent agreements that clarify and formally acknowledge anticipated resources, such as indirect costs on sponsored research.

Slaughter and Leslie (1997) and Slaughter and Rhoades (2004) describe public higher education institutions through the lens of resource dependency theory, in particular the search for alternative resources. Their thesis contends that the net effect of the global economic expansion has been to push all countries, and thereby all government-funded public institutions, into a global market competition, as capital moves to the least cost environments. Government revenue shrinks as global competition increases, slowly defunding public universities. In need of revenue, public research universities increase their focus on obtaining external funds for research, effectively shifting the research agenda from the search for fundamental knowledge to a competitive arena that offers applied research as a product for external funders (Slaughter & Leslie, p. 21). Slaughter and Leslie call this process academic capitalism and describe the role of faculty in this arena as "state subsidized entrepreneurs" (p. 9).

Other institutional theorists see organizations as *socially constructed systems* (Martin, 1992; Scott, 2003; Weick, 1976). These organizational systems are embedded in sets of symbolic structures (Martin, 1992; Scott, 2003) and shared ideologies (Tierney, 2008). This shared cognitive framework has variously been called "sensemaking" (Weick, 1995) or more traditionally, socialization (Merton, 1957). Building on this theme of socialization and socially constructed systems to negotiate the environment, another set of theorists have advanced the concept of organizational culture as a frame for understanding institutions (Schein, 2004), and in particular, higher education institutions (Bergquist & Pawlak, 2008; Birnbaum, 1988; Bolman & Deal, 1997; Manning, 2013; Tierney, 2008).

Although these studies and others discuss the complexity of organizational culture in higher education, Tierney, however, moves beyond listing typologies to discuss specific elements of organizational culture in higher education, with a focus on decision-making.

Tierney's approach to organizational culture.

Tierney (2008) integrates prior organizational culture theory to craft what he calls a critical postmodern take on organizational culture in higher education, and in particular, decision-making processes. He asserts that complex organizations such as higher education institutions are always "cacophonous and multivocal" (p. 14), burdened with competing sub-units, fragmented agendas and limited resources (p. 26). Although bureaucratic, collegial, political, anarchic and cybernetic models are revisited in his study of academic governance, Tierney emphasizes that these models can serve as lens to illuminate portions of academic decision-making but none provide an accurate, holistic portrait of the current environment in which higher education institutions exist (p. 155). Instead, the higher education organization itself, and the environment in which it operates, are constantly being interpreted and re-interpreted by the shifting members. The organization's critical need is to distill the core values essential to its existence, even as it allows processes and structures to be innovative and

responsive to change and diversity, to be creative and sustaining at the same time. Tierney calls this approach the innovating model.

Drawing on Tierney's framework, this study uses select elements of organizational culture in higher education to form the first key construct of *context* for explaining the phenomenon of public research university faculty perspectives on and behavior toward indirect cost recovery on sponsored research. The *context* of higher education organizational culture in this study includes research university institutional mission, external political and financial pressures, and internal administrative policies and procedures, which together form the institutional world where the phenomenon of interest occurs. In particular, the organizational culture of higher education attempts to address the *resource needs* it encounters, as it works to maintain its mission, its finances, and its goals and objectives. This first conceptual construct of *context*, then, is derived from organizational culture studies, resource dependency theories, and higher education organizational culture models. Context reveals the organizational culture and its resource needs.

Faculty Socialization and Faculty Reward Systems

The next construct of *content* reflects faculty socialization and the development of mutually shared values and beliefs that inform faculty behavior. Clark (1987), Boyer (1990), Blackburn and Lawrence (1995), and Schuster and Finkelstein (2006) have all noted that research university faculty are rewarded, particularly in compensation, for their scholarship more so than their teaching. Fairweather and Beach's 2002 study of 88 Carnegie Research I universities confirmed the preeminence of research in faculty reward systems despite policy initiatives to improve and acknowledge teaching (Fairweather & Beach 2002, p. 112). Obtaining research funding is a key prestige element for both the faculty and the administrators at the more than 200 American research intensive higher education institutions (Morphew & Baker, 2004; Fairweather, 2005; Schuster & Finkelstein, 2006; O'Meara, 2007; O'Meara & Bloomgarden, 2010).

This is not to say, however, that public research university faculties who successfully obtain research funding are free from pressure. On the contrary, particularly in the biological and physical sciences, research intensive higher education institutions expect that public research university faculty will obtain sufficient funding on an annual basis to maintain their laboratories, equipment, and graduate students (Schuster & Finkelstein, 2006). This pressure has not abated despite the precipitous decline in grant proposal success rates as a result of reductions in federal funding for basic research (National Institutes of Health, 2012; National Science Board, 2012). In addition, even as funding levels have declined, the administrative burden entailed in conducting sponsored research projects has dramatically increased. According to the Federal Demonstration Partnership's 2007 Faculty Workload Survey of 6,000 principal investigators, and the 2012 Faculty Workload Survey of 13,000 principal investigators, research faculty indicated they spent 42% of their time on the administrative requirements of reporting, budgeting and compliance mandates for a project rather than on conducting the research (Rockwell, 2009; Schneider, 2014). Given the time compression already squeezing tenure-track and tenured faculty (Milem, Berger & Dey, 2000; Schuster & Finkelstein, 2006; Boardman & Bozeman, 2007), the prestige of obtaining research funding appears to come at a cost. Externally funded public research university faculty can expect to be on a never-ending cycle of grant writing, proposal submission, award management and project reporting.

Despite this cost, public research university faculty continue to pursue research funding, conduct research, teach in their area of expertise, and perform service to the institution. All of these activities are part of their professional socialization, the culmination of years of training

in graduate school and in their discipline. As in other fields of expert professionalism such as medicine or law, the lengthy training period enhances group affiliation and the full dissemination of professional norms, practices, values and beliefs.

The symbolic systems adopted by the incipient faculty member over her or his years of training are multiple and complex. In their professional socialization they have worked through formal disciplinary, intellectual, scientific, technical, collegial and linguistic systems, as well as informal group affiliations and allegiances. They have learned the “ways of their world,” adopted the prevailing practices and procedures, absorbed the dominant values and beliefs, and adapted them as their own in their professional life (Becher, 1989; Schuster & Finkelstein, 2006; Tierney & Bensimon, 1996). Extraordinary time and effort have gone in to this achievement. They now have a set of goals and a mission for their career path, based on their professional disciplinary expertise and experience. They have been socialized into their professional academic arena, and this overarching symbolic system is the *content* upon which their response to organizational culture is drawn.

This second key construct of *content* is a factor in the phenomenon of research university faculty response to indirect cost recovery. This content of faculty professional socialization expresses itself in the way faculty value certain resources over others. In particular the manner in which faculty apportion their time, maintain their disciplinary reputation, and access institutional resources can be seen as markers of *resource values*. Content reveals faculty socialization and its resource values.

Political Bargaining Model

The final construct of *contest* reflects the political bargaining that occurs over resource constraints at the institutional level. Studies of faculty involvement in financial and budget processes focus on their representation on institutional committees, their decision-making as department chairs, or their allocation of time and resources between teaching, research and service (Barr, 2002; McKeown-Moak & Mullin, 2014; Schuster & Finkelstein, 2006). Faculty are generally much more involved in academic decisions than fiscal decisions at the campus level, though that can vary greatly by institution. Still, surveys confirm less faculty involvement in budgetary matters overall (Chronicle of Higher Education, 2013), beyond concern over salary increases and hiring.

In contrast to the overall lack of involvement by faculty in institutional fiscal and budgetary matters, the principal investigator in charge of an externally funded sponsored research project is expected to maintain oversight over all financial aspects of the project. She or he is responsible for approving expenditures and hiring staff, forecasting budgets over the course of the project, and accounting for cost overruns or underspending. In many departments administrative support personnel handle some of these duties, but ultimately the principal investigator is the decision maker and the individual held responsible for the financial management of the funds.

Public research university faculty who serve as principal investigators on externally funded sponsored research projects, therefore, become deeply involved in planning what costs will be necessary to successfully conduct a research project. Given the constant cycle of grant writing, proposal submission, award management, and project reporting, as noted earlier, principal investigators find themselves confronted with the reality of indirect costs, as well as direct costs, on every grant they propose or receive. They must include full indirect cost recovery on their proposal budget or provide justification for non-standard indirect costs based on sponsor guidelines or request a waiver or reduction in indirect costs.

A percentage of public research university faculties will go through the formal waiver request process. No public research university reveals exactly how many faculty request

waivers of indirect costs; therefore, one can only estimate based on limited access to institutional data and verbal accounts. At one research intensive institution, records indicated that approximately 10% of principal investigators with active awards requested a waiver or reduction in indirect costs (AVP, personal communication, March 5, 2012). Requests for a waiver of indirect costs involves a review and approval process with the central research university administration, usually the sponsored programs or research administration office. This intersection is where the political bargaining model comes into play, as public research university faculty and public research university administrators negotiate a fiscal policy decision.

This contest over indirect cost recovery is part of a larger picture outlined by Bess and Dee (2014). They note the growth in the power of higher education administration and the adoption of corporate practices and values, which emphasize centralized, hierarchical power and decision making. They characterize that shift as managerialism (Bess & Dee, 2014, p. 23). It is not surprising, then, that political bargaining and conflict between faculty and administrators may arise over the imposition of indirect cost recovery on sponsored research projects.

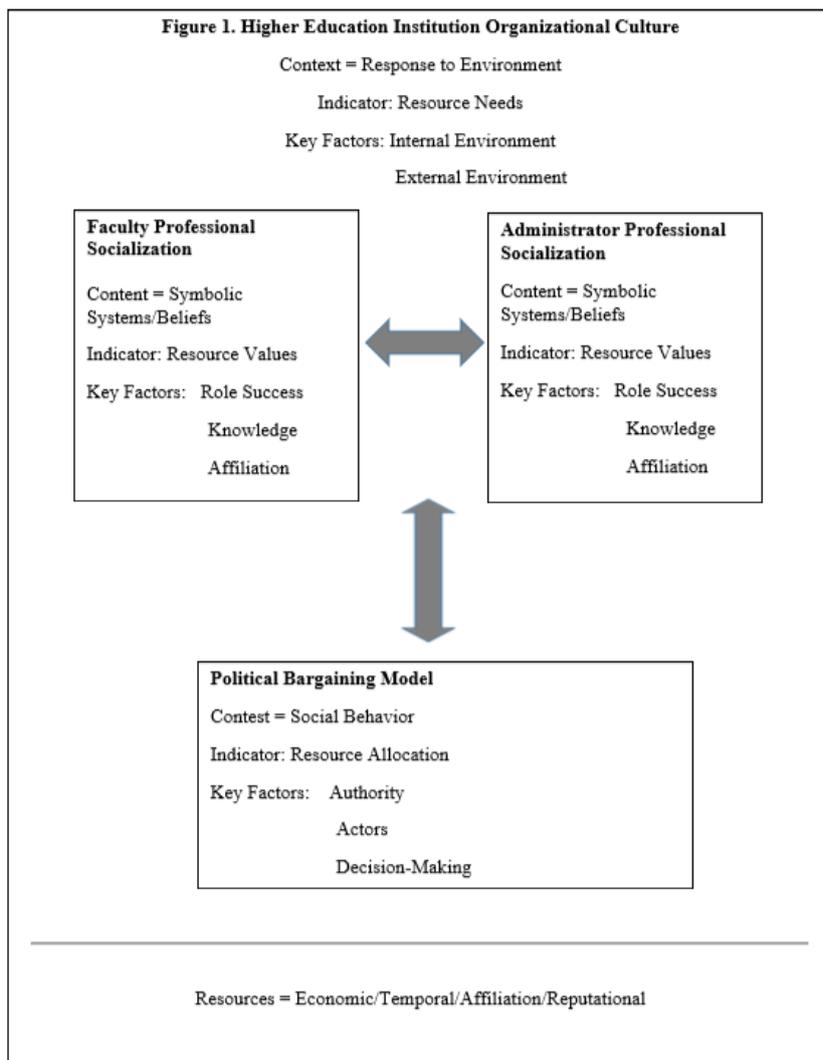
For the purposes of this study, the political bargaining model is invoked to illuminate the *contest* between the managerial authority of public research university central administrators, and the expert authority brought to bear by public research university faculty in an attempt to influence the decision outcomes related to indirect cost recovery. Political bargaining over constrained resources and faculty and administrator conflict over separate goals is the third construct of *contest* incorporated in the theoretical framework. This construct is exhibited by the *resource allocation* that occurs as a result of the intra-organizational decision-making process. Contest reveals political bargaining and its consequent resource allocation.

Conceptual Framework for Analysis of Case Study Data

My conceptual framework addresses the set of assumptions driving this study. The first assumption is that faculty response to and behavior towards indirect cost recovery represents values, beliefs, and choices drawn from the distinct professional socialization and distinct culture of faculty. The second assumption is that when faculty and institutional administrators are in conflict over indirect cost recovery, the resultant formal administrative decision may come about through political bargaining over critical resources. My theoretical framework incorporates the three conceptual streams of organizational culture, faculty socialization, and political bargaining, and arrays them so as to uncover the operating elements that may explain these assumptions.

Conceptual model.

Figure 1. Model outlines the analytic framework and shows the relationship between the three key conceptual streams. The analytic themes align along anthropological theoretical tenets, consisting of response to the environment: *organizational culture* or context; binding symbolic systems: *faculty socialization* or content; and consequent social behavior: *political bargaining* or contest. Each of those themes incorporates key factors derived from the underlying theory and concepts. For organizational culture, the key factors are the external and internal environment. For faculty socialization, the key factors are role success, affiliation, and knowledge. For political bargaining, the key factors are authority, actors, and decision-making. These analytic themes and key factors are linked to their indicators: resource needs for content, resource values for content, and resource allocation for contest.



The particular resources reflecting these needs, values, and allocation fall into four factors: (1) economic resources, such as external funding and financial support; (2) temporal resources, especially available time, through course releases or administrative support; (3) affiliation resources, such as connections to disciplinary colleagues; and (4) reputational resources, especially role success, status, and recognition. The interplay of these themes, factors and indicators may illuminate faculty perspectives on indirect cost policy and consequent faculty actions and decisions that affect the outcome of indirect cost recovery. This conceptual model was the basis for the NVIVO coding used to analyze the data.

Case Study Methodology

Site and informant selection was bounded by access to sensitive financial information, as well as my personal history in the field. I begin by describing my involvement in the case study.

Investigator History and Reflexive Stance

I have been a sponsored research administrator for two decades, and for many years I have witnessed degrees of conflict between faculty and administrators over indirect costs on sponsored research. In the world of professional research administrators, this conflict is often

attributed to ignorance on the part of faculty, at best, or to their intransigence, at worst. For example, the 2014 annual meeting of the National Council of University Research Administrators (NCURA), offered a key session to its 2,000 attendees. The session focused on uncooperative faculty behavior towards institutional and federal research policies, including indirect costs. In addition to seeing faculty as willfully ignorant, another theme is one of active defiance. Former Association of American Universities President Robert Rosenzweig describes offering testimony to Congressional committees on the necessity of covering indirect costs, only to meet faculty disciplinary societies and scientific associations coming in behind him to argue just the opposite (1998, p. 4). Finally, one also finds the theme of covert operations. Faculty and program officers at federal agencies often share the same disciplinary training and scientific backgrounds, and as Rosenzweig also notes, “No program officer ever found satisfaction in thinking about the amount of money his or her agency was providing for indirect costs” (op cit., p. 4). It is not unusual to find out a program officer and faculty member have “worked out a deal” about the indirect costs during their review discussions about a proposal, and subsequently some sort of limitation on indirect costs appears on the award. This problem happened frequently enough at the National Science Foundation that senior officials had to issue a direct prohibition of any such manipulation of indirect cost allocation (National Science Foundation, 2013).

On many occasions when witnessing such faculty and administrator conflict over indirect costs, I have thought that the parties seem to be speaking different languages. And of course they are. As representatives of two distinctly different professional groups in a large, highly decentralized, highly complex organization, each group is operating from its own cultural perspective. Language is the fundamental symbolic system for expressing cultural perspective. As we talk across one another about compliance and regulations and audit findings, or about material transfers and timely award set-up and postdoctoral hires, the conflict is not assuaged.

Given my position as a research administrator and my interest in the phenomenon of faculty attitude and behavior toward indirect cost recovery on sponsored research projects, I structured my study to concentrate on the faculty perspective. I sought other research administrator’s perspectives so as to confirm, or disconfirm, my experience in the field. But the focus of my data collection was on faculty informants. My justification was two-fold: First, a great deal of professional and regulatory literature is devoted to institutional administrative perspectives on sponsored research, incorporated in federal publications and documented institutional policies. The requirements are well publicized at the federal and institutional level. Meanwhile the academic literature regarding the faculty perspective on indirect costs is non-existent. Second, although policy frequently may differ from practice, I have had the opportunity to see both in action. I have been engaged in research administration at three different research intensive public universities. I have participated in many professional meetings where the realities of practice, as opposed to policy, are fully discussed. My goal therefore was to balance the higher education administrator perspective with the faculty perspective.

Single Site Case Study Methodology

Given the sensitivity inherent in analyzing intra-organizational conflict as it relates to critical financial resources, obtaining access to essential data regarding such a phenomenon is a vital concern. The extremely limited number of studies related to higher education sponsored research funding or conflicts related to that funding appear to bear out this assumption. Therefore my choice of the study site institution was based on its typicality as a very high research intensive institution and on my capacity to gain access to institutional data and to the

research faculty. Much of the data related to sponsored research, particularly regarding unrecovered indirect costs, is considered confidential both by the universities and by the federal government reporting agencies. Given that, familiarity with the site institution was both critical and cautionary; without familiarity, it is doubtful access to such sensitive information would be possible. Such familiarity, however, demanded my constant alertness and continuous reflection on the potential for subjectivity to influence my study, my data collection, and my analysis.

This study was conducted at a public research university located in the eastern half of the United States. This institution met the Carnegie classification of very high research activity or RU/VH (Carnegie Foundation for the Advancement of Teaching, 2014). The financial data to confirm very high research activity was provided by the site institutions' 2010-2014 audited fiscal years, and institutional financial reports on sponsored research expenditures and revenue. In fiscal year 2014 (FY14), the site institution reported approximately \$500 million in sponsored research funding, with 80% of that funding coming from the Federal government. The institution's negotiated indirect cost rate agreement (NICRA) was with the U.S. Department of Health and Human Services. The indirect cost rate for basic research during FY14 was 52%. The institution reported an indirect cost recovery rate of 27.5% for FY14, with approximately \$65 million in recovered indirect costs. As noted previously, actual recovery is based on expenditures; therefore, the 27.5% recovery is based only on total award expenditures in FY14, not on awards received in FY14.

Informant interview transcripts provided the primary data for this study, and were bolstered by secondary document analysis. The secondary data consisted of the site institution's web posted policies and procedures regarding sponsored programs, proposal preparation, budgeting, and indirect costs (approximately 40 webpages). In addition, the regulatory principles for federal funding, as embodied by the federal Office of Management and Budget and codified under 2 CFR 200 (Uniform Guidance), provided 759 pages of administrative, cost, and audit principles mandated for institutions of higher education and other non-profits upon accepting federal assistance via grants or cooperative agreements (Office of Management and Budget, 2014).

Informant selection.

The interview informants were tenured or tenure-track faculty who were active principal investigators in one of the STEM fields, with at least one million dollars in federally funded sponsored research awards during Fiscal Years 2010-2014. The focus on STEM faculty reflects the predominance of STEM fields as recipients of federal government sponsored research funding (NCSES, 2016). Approximately 80% of federal basic research funding nationwide goes to the STEM disciplines. That held true at the site institution for this study, where 80% of federal funds were directed to STEM fields during fiscal years 2010-2014. These STEM faculty were assumed to have the expertise and experience necessary to illuminate the faculty perspective on indirect costs.

The faculty were selected through purposeful and snowball sampling techniques. From an initial set of active principal investigators, available through the institution's website and publicly available award records, contact was made via email to ascertain the principal investigator's interest in and willingness to participate in the study. From this purposeful selection of active respondents a request was made for suggested contacts of other principal investigators (snowball sampling) so as to ensure active investigators were included beyond those presented through promotional venues. The goal was to interview faculty members across a representative spectrum of STEM academic departments. In total 37 individual investigators

were contacted. Of those contacted, 13 agreed to participate in the study. Two of those individuals subsequently were unavailable for an interview during the data collection period.

Only tenured and tenure-track faculty were selected for this study. The focus was on the traditional faculty professionalization path, from doctoral student, to Ph.D. recipient, to assistant professor, and finally to tenured associate and full professor. These are the individuals who are expected to fulfill the mission of a public research university, and the concomitant obligations of teaching, research, and service. Many public research universities today have bifurcated faculty roles, which split off teaching duties onto contingent and adjunct faculty, and research duties onto faculty research associate or post-doctoral positions that are non-teaching and not on faculty lines, i.e., are fully grant-funded or on “soft” support (Schuster & Finkelstein, 2006). Despite these changes in faculty positions, this study reflects the professional trajectory of tenure line faculty, who so far as the data reveal still receive the majority of sponsored research funding.

The dollar threshold for federal sponsored research funding is based on the National Institutes of Health major basic research grant, called the R01. The National Institutes of Health (NIH) is the top U.S. federal agency underwriting basic research support, providing more than \$30 billion dollars in fiscal year 2015. The NIH is the largest funder of basic research in the world, although the Chinese government is on track to surpass it (Moses et al., 2015). Bio-medical researchers begin their professional research careers seeking to obtain an R01, which typically provides \$250,000 a year in research support, or one million dollars over four years (National Institutes of Health, 2015). I decided to use the minimum threshold of one million dollars in federal sponsored research support, over four fiscal years, as the standard for determining whether a potential informant was a highly successful principal investigator and experienced grant recipient.

Total federal sponsored research funding for the informants, as confirmed by institutional records, was \$46 million dollars over four fiscal years, from 2010 to 2014. The range of total award amounts per informant ran from \$1 million to \$8.9 million, with a median of \$3.2 million. All of the funding for all the informants fit the category of basic or fundamental research; none of these principal investigators conducted applied research during the period under study. This predominance of basic research aligned with institutional records, which indicated that 72% of sponsored research awards from 2010 to 2014 were for basic research. With the exception of one assistant professor, all of the informants were tenured associate or full professors, and included one associate chair, one chair, one center director and one distinguished professor. The median length of time since receiving the doctorate was 20 years, with a range from 10 years to 39 years. Eight of the informants were Caucasian and three were Asian (including East and South Asian). Eight of the informants were male and three were female. Five of the informants were foreign-born. Nine of the informants ran a laboratory as part of their research portfolio. The dominant federal funding agency for the informants was the National Institutes of Health, closely followed by the National Science Foundation, and also included the U.S. Department of Energy, the National Aeronautics and Space Administration and the U.S. Department of Agriculture. A table outlining informant characteristics is provided in Figure 2.

Figure 2. Informant Characteristics

PhD	Appointment	Gender	Race	Foreign born	Laboratory	Waiver	Sponsor One	Sponsor Two	Award Total
1975	Distinguished U Prof	M	W	No	Yes	No	DOE	NSF/NASA	6.30
1978	Director & Assoc. Prof	M	W	No	No	Yes	NIH	State	8.90
1986	Prof & Chair	F	W	No	Yes	No	NSF	DOE	2.60
1987	Assoc. Prof	F	W	No	Yes	No	NSF	NIH	1.10
1993	Assoc. Prof	M	W	Yes	Yes	Yes	USDA	USDA	6.50
1994	Assoc. Prof	M	A	Yes	Yes	No	NIH	NIH	6.70
1997	Prof & Assoc. Chair	M	W	Yes	No	Yes	NSF	NIH	2.60
1997	Professor	M	A	Yes	Yes	Yes	NIH	NIH	6.00
1997	Assoc. Prof	M	W	No	Yes	No	NSF	NIH	2.00
2000	Asst. Prof	F	W	No	Yes	No	NIH	NSF	3.20
2004	Assoc. Prof	M	A	Yes	Yes	No	NIH	USDA	1.00

A case study approach is appropriate when the goal is to understand complex social phenomenon while retaining the “holistic and meaningful characteristics of real life events” (Yin, 2003, p. 2). The trustworthiness of case study research depends on its rigor and reliability, what Yin calls its “logical model of proof” (2003, p. 34). That logical model of proof connects the logic of the design, the logic linking data to propositions, and the logic of the analysis.

In this study I sought to understand a phenomenon from the perspective of the informants; in this case public research university STEM faculty involved in sponsored research. The goal in this instance was to unravel the nature of public research university STEM faculty response to indirect cost recovery on sponsored research projects. This type of inquiry, attempting to grasp the informants’ view of the situation, does not lend itself easily to statistical or quantitative assessment. Instead, this study employed an ethnographic perspective approach in an explanatory qualitative case study. Focusing on informant interviews, the goal was to obtain a description of what the informants understand about the phenomenon, how they interpret what happens, and why they make the decisions they do.

Interviewing

Guidance on conducting interviews was provided by Spradley (1979), Murphy (1980), and Wolcott (1999, 2001). Following their guidance a developmental sequence was utilized: beginning with demographic questions and background questions, leading to domain defining structural questions (i.e., from “What is the impact of seeking Federal funding for you?” to “How did you come to understand indirect costs?”) to contrast questions (“How would you explain indirect costs to a new graduate student?). Follow up probe interview questions incorporated the themes and key factors as identified in the conceptual framework, i.e., organizational culture, faculty socialization, and political bargaining.

After submitting my Institutional Review Board (IRB) application and responding to the committee’s questions regarding consent and confidentiality, I was granted my IRB protocol in September 2014. I requested permission to digitally record the interviews from every informant. An interview debrief journal was maintained as close to the interview session itself as possible. The goal of recording and immediate journaling was to reduce the influence of the interviewer’s “translation competence” (Spradley, 1979, p. 71), the tendency to

condense, summarize, and make more familiar the responses of others. In addition, member checks were utilized to confirm accuracy, with two of my informants reviewing their individual transcript records.

Data Collection and Analysis

Data collection and analysis, while an iterative process, still followed a predominantly sequential pattern. Interviews were conducted over the course of one month; each interview was undertaken in the informant's campus office, during regular business hours, with the time and location entirely at their preference. The interviews with the 11 informants concluded with 10 digital recordings and one written recording. One of the informants preferred not to be digitally recorded; in that case, I took extensive notes during the interview. The 10 digitally recorded interviews lasted between 50 minutes and an hour, for an average of approximately 55 minutes. The one unrecorded interview lasted approximately an hour and a half.

I spent more than 60 hours transcribing the digital interviews myself, playing and re-playing each interview at least three times to ensure I keyed in every word and sentence fragment. After the 11 transcripts were consolidated into a 120 page document, I licensed QSR NVIVO version 10, a qualitative data analysis software package. Using the conceptual framework as a guide, I entered the themes, key factors, and indicators as nodes, for a total of 18 data points. I input the transcript data and proceeded to code each word, sentence fragment, and full sentence alongside the 18 nodes. I then searched through the NVIVO data to ascertain whether or not the themes, key factors, or indicators could be constructed from the informant transcript record. All transcript items were evaluated using the reference points outlined in the conceptual framework. I intentionally coded to the maximum, i.e., in order to avoid my own potential biases and assumptions. If any word, word phrase, or sentence included any reference with any link to any of the nodes, it was included in the data for that node. With each step of the review, I had to check the reliability of my interpretations, using my conceptual framework as my guide.

This concept driven coding determined whether an alignment could be found between the informants' understanding and my conceptual framework. As noted by Yin (2003), one way to confirm external reliability is the use of operational concepts defined prior to data collection. These operational concepts are incorporated in the conceptual model used for the study. In this study the use of themes drawn from the literature, key factors connected to the thematic constructs, and indicators seen as reflecting those factors, serve as operational concepts.

Using the conceptual framework as a guide, I set the themes against the corresponding key factors: external environment, internal environment, role success, affiliation, knowledge, authority, actors, and decision-making. These factors were arrayed along the indicators of context and resource needs, content and resource values, and contest and resource allocation. My assumption was that the key factors would reflect and illuminate the conceptual model and confirm, or disconfirm, the viability of the organizing themes. After my 120 pages of interview transcript were fully coded, I had 570 pages of cross-coded data. I used multiple queries to package and re-package the data, starting with word frequency queries, then constant comparison analysis, and finally domain analysis queries. I also created a set of analytic memos breaking out the data across my conceptual framework. My goal was to ascertain whether or not the data aligned with my conceptual framework.

While coding, particular markers for **context and organizational culture** were: (1) informants' discussion of funding pressures from both the external and internal environments; (2) references to organizational policies and procedures that address resource needs; (3) explicit and implicit institutional priorities that specify how to handle resource constraints; and (4)

institutional statements regarding funding issues. The resource needs focused on for this theme were economic, temporal, affiliation, and reputational. Particular markers for **faculty socialization and content** were: (1) informants' discussion of faculty goals and motives; (2) references to the importance and impact of disciplinary connections; (3) institutional information exchange or lack of it; (4) perceived autonomy of faculty in acting on resource values; and (5) sense of collegiality and respect for expertise. The resource values focused on for this theme were economic, temporal, affiliation, and reputational. Particular markers of **political bargaining and contest** were: (1) informants' discussion of requests for waivers or reductions on indirect costs; (2) negotiations over budget items in proposals; and (3) expressed conflict over obtaining or utilizing indirect costs. The resource allocations focused on for this theme were economic, temporal, affiliation and reputational.

The research design table lays out the relationship of the research questions, key factors, indicators and data sources. My deductive, theory-driven coding incorporated all the markers noted above as I searched through the informants' words. Although interview data was the primary source, the various federal and institutional regulations and policies regarding financial assets such as research awards and indirect costs are the secondary source. Research faculty have to sign off on proposals to federal agencies, indicating they understand the legal and financial obligations regarding sponsored research awards. Whether they fully grasp those obligations was one aspect of my study, with my focus on their perspective on indirect costs.

Table 1. Research Design

Primary and Secondary Research Questions	Key Factors	Indicators	Sources of Data
What is the public research university faculty understanding of indirect costs?	External Environment Internal Environment Role Success Affiliation Knowledge	Resource Needs Resource Values	Informant Interviews Institutional Records Public Documents
What is the public research university faculty behavior toward indirect costs?	Authority Actors Decision-making	Resource Allocation	Informant Interviews Institutional Records Public Documents
Does organizational culture/context help explain the public research university faculty understanding of and behavior toward indirect costs?	External Environment Internal Environment	Resource Needs: Economic Temporal Affiliation Reputational	Informant Interviews Institutional Records Public Documents
Does faculty socialization/content help explain the public research university faculty understanding of and behavior toward indirect costs?	Role Success Affiliation Knowledge	Resource Values: Economic Temporal Affiliation Reputational	Informant Interviews
Does political bargaining/contest help explain the public research university faculty understanding of and behavior toward indirect costs?	Authority Actors Decision-making	Resource Allocation: Economic Temporal Affiliation Reputational	Informant Interviews

Findings

The purpose of this case study was to illuminate the perspectives of public research university STEM faculty regarding indirect cost recovery. The most surprising result was that my assumption about explicit political bargaining over indirect costs did not appear in the transcript record. Instead, these accomplished research faculty expressed a relative powerlessness over indirect costs and how those funds are used at the institution. The narrative shared in my profession was not reflected in the words of the faculty. Instead of resisting indirect costs, the informant faculty by and large accommodated the application of indirect costs on their research grant budgets. Instead, they were generally perplexed about how those recovered costs are apportioned across campus, and whether the basic cost of research infrastructure is actually supported by those recovered funds.

Thematic Integration: Faculty Socialization

Faculty professional socialization was the dominant theme emerging from the informants, along with its key factors of **role success** and professional **knowledge**. The faculty socialization data elements and markers linked together represented nearly 40 percent of the weighted transcript record, based on my cumulative analytic queries. Even though the bulk of my 17 interview questions focused on a very specific financial instrument applied to research funding – indirect costs – my informants expanded in their responses to link the existence of indirect costs to all the myriad issues they address on a daily basis when it comes to conducting basic research. They wanted to talk about the constant pressure to bring in external funds, the need to financially underwrite their labs with their own grants, the need to support graduate students to help conduct the research and build future expertise, the limited time available to juggle it all. They spoke at length about learning what it means to be a STEM faculty member, and about understanding what it takes to stay on the tenure track. For the faculty, the story is not so much about resisting or avoiding indirect costs, or about political bargaining over grant funds. It is about the struggle research scientists in STEM face trying to keep their research programs afloat:

So I would say, my appointment is 80% research and 20% teaching; the 20% teaching, I still go out there and do my job and teach. But the majority of my time is spent thinking about my research program, how am I going to do it, where are the funds going to come from, how can I keep my lab running?

Even though continuous grant writing and research article writing may support each other, the relentless pressure to bring in funding, and the anxiety when funding lags, is constantly on the STEM faculty radar. As an informant detailed:

It's incredibly stressful. My NSF grant ended in June, and I had known for the entire year before that that I was running out of money. So I let people go, I didn't take on any new students, because if I don't have funds to support people for x number of years, then there is no point getting them started. And then, miraculously, I found out the next grant from the NIH was going to come through. And suddenly, the sun rises, everything is o.k. It's incredibly stressful.

STEM research faculty often wondered if anyone outside their field understands how the research world works. Faculty were deeply aware of the toll constant research funding pressure

takes on their other obligations. Faculty also wondered if the professional path they followed in getting their STEM graduate degree will continue to exist:

I think there is a feeling that long term the job market for Ph.D.'s in science is worse than it used to be. When I was going through grad school, you came out of grad school with all these different options. You could go to an academic postdoc and follow that academic route, or you could get a job in industry, or you could get job in government, everybody was hiring. It didn't matter what you wanted to do, you could do it. So the idea was, say, the default was to be an academic, because that was what you knew and that was what your advisor did, so that was your model. But you could always go to industry if that doesn't work out. Now all the pharmaceutical companies are closing down their research and development units, there's been massive hemorrhaging of jobs in the bio-medical corporate sector, and I feel like there's not that many jobs in industry any more. So everybody's contracting at the same time. So what do these Ph.D.'s do? Yet, at the federal level, you keep hearing that it's important that we keep sending more kids into STEM. There is a real disconnect.

Faculty socialization is the *content* that informs faculty perspectives on the phenomenon. STEM public research university faculty informants described an array of resource values that drive their research agenda. In particular, they know that their disciplinary reputation and role success are dependent on achievement in their particular field. This achievement involves obtaining research funding, conducting successful research programs, and publishing the results in discipline-based peer-reviewed journals. My STEM informants discussed the team dependent nature of scientific inquiry, and the importance of collaborators, graduate students, and postdocs in their role success. They emphasized the extraordinary time commitment and time compression involved in juggling their multiple roles and multiple expectations, including teaching courses, applying for grants, conducting research, writing reports, managing labs, and mentoring students. STEM faculty are responsible for the viability of their research portfolios, and as such expect a certain degree of autonomy and a certain amount of respect in determining the course of their research programs. Even so, they know that they are subject to the vagaries of external funding priorities, and dependent on fluctuating internal institutional support. They juggle their time, money, connections and effort with one over-riding goal in mind: to be able to conduct science. These are the resource values – temporal, economic, affiliation and reputational – they invoke to support their research agenda.

Thematic Integration: Organizational Culture

Organizational culture as a theme was invoked nearly as frequently as faculty socialization, along with its indicator of **resource needs** and specific resource types: **economic resources** and **reputational resources**. The organizational culture data elements and markers linked together occupied a third of the weighted transcript record, based on my cumulative analytic queries. Faculty attitude towards indirect cost recovery represents one small issue in a large, complex institutional environmental picture. Faculty link indirect cost recovery to their sense of whether or not they receive critical support, or even appreciation, from the organization for bring in the funding. These research faculty are fully aware of indirect costs but don't feel fully informed as to how the organization uses the indirect costs that are recovered:

I don't understand indirect costs. And I don't know where my 52% goes. I was a postdoc at another research university, and when I came here this university did not know what a K award was [an NIH career development award]. I was the first one to bring one here. And K awards have their own F&A rate. I don't know where my F&A goes. I have to empty my own garbage can, I have to vacuum my own office. Our lab has to take care of its own garbage. We have to mop our own floors. Walk down the hall, the lights are off. I bring in a huge amount of indirect, I'd like to know where it goes.

Instead, faculty see indirect cost recovery as a kind of symbol, part of the generally opaque and mystifying budgetary process that goes on at higher levels in the administration. The budget decisions land on them in the middle of everything else they do as tenure line faculty: teaching courses, conducting research, managing a lab, managing a grant, publishing articles, mentoring graduate students. They don't understand how financial resources are allocated because it isn't made truly transparent, for reasons they don't know but guess at:

Especially our new administration, they are putting a lot of money into things, like the entrepreneurship institute and the international center and the teaching-learning center, that are neither research nor teaching. It's some education type thing for students. All these sort of initiatives are coming down the pike. Nobody tells you where the funding comes for those, and considering how much funding is going for the education of students, one can only conclude that the research overhead, the return is being cannibalized. That's what everybody thinks.

Organizational culture is the *context* in which the phenomenon plays out. Public research university STEM faculty informants described the urgency of resource needs, specifically economic resources, required to accomplish their research goals. They experienced intense pressure from the internal higher education institutional environment to obtain funding, in order to maintain their laboratories and their research portfolios. They were acutely aware of institutional expectations to bring in sponsored funds, as well as the weight that external funding carries in promotion and tenure decisions. They detailed their worries over the decline in grant proposal success rates. They discussed the shift in the external funding environment, which has created even greater competition for a shrinking pool of external funds. They had seen the promotional materials from central administration tallying the institution's increased research funding, and they were generally aware of policies and procedures regarding indirect costs. STEM faculty focused on the economic resources needed to support their research agenda.

Thematic Disintegration: Political Bargaining

Political bargaining and its indicator of **resource allocation**, along with the key factor of **decision-making**, was the least discussed theme. The political bargaining data elements and markers linked together represented 18 percent of the transcript record, based on my cumulative analytic queries.

STEM faculty were frustrated, not only by the lack of clarity, but by the shifting policy decisions regarding institutional research funds:

I tried to save some of my start-up funds to fill in some of these [funding] gaps. But then the university decided we needed to spend down these institutional

funds, because they thought the state legislature was unhappy with us carrying balances. But now apparently they want us to get our balances back up again, because somehow that helps the bond rating of the state. I wish they would just pick an opinion and stick with it. And so if you feel like you've got these monies but suddenly the Dean is coming to faculty meetings and saying well, if you don't spend it, we're going to take it away, that's not a good scenario. How are we supposed to cover those gaps?

Political bargaining is the *contest* revealing faculty behavior towards the phenomenon. STEM public research university faculty informants discussed the allocation of economic resources at the institution, and their occasional intersection with the central administration authorities who are involved in that internal allocation. They did request waivers of indirect costs on certain projects and, therefore, seek central administration approval in such cases. However, the involvement of STEM faculty with authoritative decision-making was limited to these infrequent interactions. When it comes to authoritative decision-making, they most often spoke about interactions with external authorities, particularly program officers at funding agencies. In lieu of significant bargaining or frequent negotiations with institutional authorities, STEM faculty offered much speculation regarding internal, central administration decisions over the allocation of the indirect cost recovery, and its relationship to the overall institutional budget for research. They found the management of these funds to be opaque and mystifying.

My analysis indicated that faculty understanding of indirect costs is incomplete and superficial. Institutional information regarding indirect costs is limited, as is faculty time, which contributes to weak understanding. My analysis also indicated that faculty behavior toward indirect costs is essentially instrumental, minimally accommodating, and rarely confrontational. Faculty response to indirect costs was premised on their belief that it isn't worth their time or effort to address indirect costs in any significant manner. Instead, faculty time and energy was concentrated on the financial and professional survival of their research programs and the discoveries emerging from their research. Rather than confrontation, they relied primarily on conjecture in addressing indirect cost recovery and its utility.

Discussion and Implications

Faculty socialization, and its content addressing role success, necessary knowledge, and professional affiliation, drives STEM faculty to concentrate on *discovery* from their research programs as a dominant concern. Their perspective on and response to indirect costs is conditioned by the need to ensure they can obtain viable results from their research portfolios.

Organizational culture, and the context of addressing internal and external environments, drives STEM faculty to concentrate on the financial and professional *survival* of their research programs as a dominant concern. Their perspective on and response to indirect costs is conditioned by the need to ensure they can maintain their research portfolios.

Political bargaining, and its contest involving authority, actors, and decision-making, drives STEM faculty to rely on *conjecture* regarding their research program funding as a dominant concern. Their perspective on and response to indirect costs is conditioned by their uncertainty as to whether the indirect cost recovery actually benefits their research portfolios.

STEM public research university faculty informants reveal that their perspective on and response to indirect costs is conditioned by the need to ensure they can maintain their research portfolios, by the need to ensure they can obtain viable results from their research portfolios, and by their uncertainty as to whether the indirect cost recovery actually benefits their research portfolios. They concentrate on economic survival, scientific discovery, and budgetary conjecture. Where they believe it is worth their time and effort, they will attempt to minimize

indirect costs on their research projects. Four of the study informants had requested waivers of indirect costs on some projects. Even so, all informants expressed limited concern about indirect costs as a fact of life, and generally accept the need for some recovery for basic institutional costs. Rather than a proxy for resistance, waivers appear to be a proxy for survival. What informants show more concern about is the shriveled support for the research enterprise as a whole, both from external sponsors and from internal allocations. They see their own research portfolios under assault, in need of constant trolling for funding and staff and time. They find the institutional budget process murky and unclear, and the institutional research infrastructure shaky and uneven.

Might there be alternative explanations for these results? The informants were selected based on their experience and expertise in seeking and managing federal research funding. More than a third of them had requested indirect cost waivers on their projects, indicating an intent to limit indirect cost recovery. Even so, they rarely discussed any overt disagreement with administrators over the policy itself. It is possible they did not want to reveal that attitude. However, they did discuss their suspicions as to whether or not the recovery had any utility for them. They also outlined other critiques regarding administrator support, or lack thereof. Given the opportunity to weigh in on the topic of indirect cost recovery, the data overwhelmingly indicates research faculty focus on their research agendas and not on conflict with administration.

Implications for Research and Practice

Bess and Dee (2014) warn about the growth in the power of higher education administrators, and the concomitant focus on efficiency, effectiveness, and accountability models imported from the corporate world. Administrators frequently employ “strategic ambiguity” when they do need to obtain community support for future plans or mission statements (Bess & Dee, 2014, p. 69). This technique permits higher education leaders to employ broad statements and generic symbols without specifying actual plans. Particularly when attempting to address research infrastructure support, this study makes clear that such ambiguity can backfire. STEM faculty informants are unconvinced that the indirect cost recovery so important to central administrators is of any actual benefit to them. Strategic ambiguity, in this study, leaves research faculty with no reassurance that critical fiscal resources will be used to support their endeavors. Ironically then, just as Tierney predicted, when shared meaning and purpose have not been achieved in the higher education organizational culture, a dissonance emerges in the organization’s response to the external environment (2008, p. 99). In this case, the faculty continue to request waivers, and continue to negotiate indirect cost reductions with federal program officers, given they see little connection between indirect cost under-recovery and their own capacity to achieve their research objectives.

Similar to another non-profit, mission-driven institution, a hospital, I posit that faculty and students are the essential elements of a university just as doctors and patients are the essential elements of a hospital. Interactions between administrators and the expert professionals of an entity (faculty or doctors), or interactions between administrators and the beneficiaries of that professional expertise (students or patients), should be conducted with the recognition that the organizational structure of a university or hospital is profoundly different from a corporate, profit-driven, industrial production enterprise. To that end, future organizational studies may need to reconsider how to categorize inter-group interactions at such expert professional-dependent entities as hospitals and universities.

Following this concern, this case reveals another issue for organizational studies. The conceptual framework relied heavily on resource dependency theory and the constant search

for resources. The conceptual framework also invoked anthropological theory, which assumes the constant search for resources in order to survive, and the constant creation of resources, such as knowledge or connections to others, in order to thrive. Organizational culture studies, particularly when investigating modern, complex, expert professional entities such as higher education institutions, or public hospitals, or school districts, or software engineering firms, need to recognize that for these organizations, both the *search* for resources and the *creation* of resources are fundamental processes. Anthropological theory, in this case, helps expand the notion of what resources are truly critical for these enterprises. Higher education organizational culture studies must acknowledge the importance of not only the economic resources, but also the temporal, affiliation and reputational resources that sustain it. This rebalancing may inform our understanding of the consequences of seemingly purely financially-driven decisions, such as relying on adjunct faculty for the majority of instruction, or not providing adequate administrative support to research faculty. Those fiscal decisions may ultimately lead to declining student success, or declining indirect cost recovery, impacting institutional effectiveness and fundamental resources in unanticipated ways. The premise holds that institutional budget allocations can reveal underlying institutional values. Therefore, if indeed the indirect cost recovery is used primarily to support basic research, then the actual allocations are worth revealing. Higher education administrators may find public research university STEM faculty will request fewer waivers if they are reassured that the indirect cost recovery supports their research agendas. If, however, much funding is being redirected to other initiatives, to foster better public relations with external constituencies or to advance administrator profiles, then the faculty skepticism will be confirmed.

Basic research needs basic support. If higher education administrators truly want to support the serendipitous slog that is science, then they need to do all they can to relieve the extraordinary administrative burden that currently undermines science and scientists. That 42% of principal investigator's time is spent on administrative activities, rather than on their actual research, is a troubling enough finding (Rockwell, 2009; Schneider, 2014). This redirection of expertise can be fixed. Just as for the teaching arena the focus should be on what creates student success, the focus for the research arena should be on what creates faculty success. Higher education administrators may advance research faculty success by emphasizing support.

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Article Citation

Gossman, S. (2019). Sponsored research indirect costs: A single-site case study of public research university STEM faculty members' perspectives. *The Qualitative Report*, 24(10), 2402-2425. Retrieved from <https://nsuworks.nova.edu/tqr/vol24/iss10/1>
