

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/225837986>

# The institutionalization of expertise in university licensing

Article in *Theory and Society* · January 2011

DOI: 10.1007/s11186-010-9136-y

---

CITATIONS

12

READS

46

1 author:



Jason Owen-Smith  
University of Michigan

75 PUBLICATIONS 5,599 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



University - Industry Relations [View project](#)

## The institutionalization of expertise in university licensing

Jason Owen-Smith

© Springer Science+Business Media B.V. 2011

**Abstract** This article draws on ethnographic data from a field leading university licensing office to document and explain a key step in the process of institutionalization, the abstraction of standardized rules and procedures from idiosyncratic efforts to collectively resolve pressing problems. I present and analyze cases where solutions to complicated quandaries become abstract bits of professional knowledge and demonstrate that in some circumstances institutionalized practices can contribute to the flexibility of expert reasoning and decision-making. In this setting, expertise is rationalized in response to institutional tensions between academic and business approaches to deal making and professional tensions between relational and legal approaches to negotiation. Abstraction and formalization contribute both to the convergence and stability of routines and to their improvisational use in professional work. Close attention to these processes in a strategic research setting sheds new light on an interesting tension in sociological theories of the professions while contributing to the development of a micro-level, social constructivist institutional theory.

**Keywords** Technology transfer · Innovation · Knowledge · Professions · Ethnography · Institutional change

Institutional theory is rediscovering its micro-level, social constructivist roots (Berger and Luckman 1967; Garfinkel 1967; Zucker 1977). This return to phenomenological foundations comes from multiple directions and aims at several, related analytic ends. Walter Powell and colleagues, for instance, attend to local practices, situated meanings, and identities to explain continuity and change in organizational practices (Powell and Colyvas 2008) while more tightly wedding

---

J. Owen-Smith (✉)  
Department of Sociology, University of Michigan, 500 S. State St., # 3001,  
Ann Arbor, MI 48109-1382, USA  
e-mail: jdos@umich.edu

institutional and network theories of social and economic action (Owen-Smith and Powell 2008). Similarly, Stephen Barley positions institutionalism on the job in an effort to return work to its once central place in organizational theory (Barley 2008; Barley and Tolbert 1997).

Scholars working in several areas have made language; story-telling, translation, and the circulation of ideas their focus (Cziarniawska 1997; Suddaby and Greenwood 2005; Lounsbury and Glynn 2001; Sahlin and Wedlin 2008). Finally, researchers working under the rubric of “inhabited institutionalism” examine how the broadly held, but abstract “rational myths” at the heart of institutions are embodied by people going about their business in mundane organizational settings (Hallett and Ventresca 2006; Binder 2007; Hallett 2010). All these efforts focus attention on local work, meaning, language, and identity. They target continuity and change; the process by which institutional arrangements traverse organizational boundaries, become instantiated in particular locations, and are sometimes transformed by their travels.

This article examines how highly visible members of a young occupation at work in an elite organization use competing evaluative rhetorics and free-wheeling comparisons to resolve pressing problems. When those locally appropriate resolutions are standardized they abstract expert knowledge from situated practice. That process happens in three stages. First, a new occupation develops a characteristic language that invokes multiple vocabularies of worth (Boltanski and Thevenot 2006) or varied logics of appropriateness (March and Olsen 2008) to make evaluative judgments and account for actions. Next, members of the occupation working in specific settings collectively mobilize their argot and experience to craft novel and locally appropriate solutions to pressing problems. Finally, some of the idiosyncratic resolutions developed in response to particular situations are transformed into abstract rules and processes for handling entire classes of conundrums.

In what follows, I outline a set of generative tensions in sociological theories of professions that focus on the role of expertise in processes of organizational isomorphism (DiMaggio and Powell 1983) and differentiation (Abbott 1988). I next elaborate on the process of institutionalization. I contend that attending to daily work without losing sight of the larger field in which work-organizations are situated can resolve those tensions by explaining the circumstances under which professional expertise might contribute to local flexibility in action and evaluation. Finally, I draw on concepts from science studies to make sense of the processes of problem resolution and solution rationalization that I observe.

My analysis relies on observational and interview data collected during 18 months of field work in the successful, high profile Technology Licensing Office TLO at Elite Private University (EPU). I focus on routine group meetings where collective efforts to define and resolve problems that arise in the course of the TLO’s work contribute to a body of expert knowledge that is growing along with the occupation of university technology manager. This TLO is a strategic research site (Merton 1987) because of its high volume of deals, reliance on internal training, and eschewal of employees from more established, rival fields such as law. Those features coupled with the TLO’s economic success and visibility in the broader occupation mean (1) that this setting is fertile ground for a study of problem resolution and (2) that rules and tools developed there are likely to be exported and used elsewhere. When the

outcomes of work in this TLO are institutionalized, they help to set the tone for academic licensing efforts generally. As a result, the work I observe has direct implications for field level transformations taking place as academic discoveries are more and more often treated as property to be sold or traded to commercial partners (Owen-Smith 2003).

Examining the emergence and standardization of occupational expertise highlights the central importance of language and know-how to stability *and* change in institutions by treating professional knowledge as an “emergent structure.” Emergent structures develop as “the interpretations individuals give to their world become repeated, patterned, stabilized” components of larger social systems that constrain future opportunities for action and meaning-making (Silbey 2005, p. 336). Such structures are the “rational myths” made famous by institutional theory. They serve as the building blocks of organizations and “litter the landscape” of modern societies (Meyer and Rowan 1977, p. 345). Recent studies of legal consciousness (Ewick and Silbey 1998), standards of originality (Guetzkow et al. 2004), commensuration (Espeland and Stevens 1997), and the development of identities (Armstrong 2002) offer cases in point but do little to address the sources of new knowledge. That source is a micro-level process of institutionalization.

## Expertise, language, and institutionalization

A tension in approaches to expertise

Two related conceptions of professions hold credence in sociology: structural, expert jurisdiction theories (Friedson 1988; Abbott 1988; Brint 1994) and the neo-institutional tradition in organizational analysis (Meyer and Rowan 1977; DiMaggio and Powell 1983).<sup>1</sup> Abbott’s (1988) systematic theory of professions offers a now classic statement of the former by highlighting the overall structure of relationships among professions and internecine conflicts over particular areas of expertise and jurisdiction. This argument rests on the micro-foundation of individual efforts to resolve problem cases (*ibid.*, ch. 2).

Consider Abbott’s discussion of inference, a core aspect of professional work that flexibly links “diagnoses” of problems to appropriate “treatments.” Professionals rely on inference when the linkage between an open problem and standard solutions is unclear or ambiguous. Resolving hard problems is the means by which professional knowledge is expanded in practice: “[I]nference has a number of qualities that help subjectively define a profession’s area of work and thereby shape

<sup>1</sup> For the purposes of this discussion, I treat as professions any occupation in which experts draw on abstract bodies of knowledge to solve problems they might never have encountered before (Brint 1994; Van Maanen and Barley 1984). Focusing on expertise and the application of knowledge in practice rather than on credentials, formal training, and the normative work of professional societies (Wilensky 1964) broadens our view beyond doctors and lawyers (the traditional “professions”) to include other expert occupations such as professors (Lamont 2009), engineers (Kunda 1991), consultants (McKenna 2006), teachers (Hallett 2010), meteorologists (Fine 2007), managers (Khurana 2007), cops (Bittner 1967), bureaucrats (Lipsky 1983) and technology licensing officers.

the jurisdiction it exercises over its tasks” (Abbott 1988, p.52). Inference plays a continual role in the development of professional knowledge as practitioners encounter new challenges and changing situations render existing solutions obsolete.

The abstract rules of practice that characterize a new profession crystallize when conclusions reached through inference in particular settings are rationalized. People standardize and codify their work as a means to define and defend areas of expertise and authority in the context of existing claims to jurisdiction. Rationalization is thus a means for occupational groups to stake out territory relative to their competitors. The abstract rules and standard tools that emerge from this process can also streamline work.

Organizational theorists have emphasized the link between rationalization and efficiency since Weber (1978, p. 122), who defined the former concept as “the substitution for the unthinking acceptance of ancient custom of the deliberate adaptations to the situation in terms of self interest.” Weber tied such adaptations to the rise of capitalism, rational-legal authority, and bureaucracy. He also, however, noted that increasing societal rationalization had a dark side, forging an “iron cage” from which humanity had little hope of escaping. Contemporary theorists recognize the constraining effects of rationalization, but believe the process is less and less driven by pressures toward efficiency (DiMaggio and Powell 1991).

Both the positive and the negative sides of rationalization are apparent in the work of professionals whose standardized knowledge, common training, and personal networks contribute to homogeneity in organizational fields (Galaskiewicz 1985). Entrepreneurship on the part of emerging professions can generate novelty (Brint 2002). But once professions become established they stand outside of individual organizations and exert normative pressures upon them without necessarily contributing to their efficiency (DiMaggio and Powell 1991).

I take both the expert jurisdiction approach and the new institutionalism to be correct insofar as they go. I note, though, that juxtaposing these positions reveals analytic tensions that need to be addressed. Consider the disjuncture in these theories’ treatment of established professional knowledge. In the jurisdictional view, professional expertise and authority foster discretion in individual efforts to grapple with new problems. Expert work is thus an arena for the exercise of social skill in organizations. This flexibility helps assure the fluidity of a system of interlocking jurisdictions occupied by competing groups. The neo-institutional view, in contrast, takes professional knowledge and autonomy to foster common mindsets that, in turn, result in nearer to rote implementation of well-known rules and tools that may be ill-suited to novel challenges. Here, professional work drives convergence and ultimately decouples codified procedures from the technical details of organizational practice.

The tension in treating codified expert knowledge as a source of social heterogeneity and a spur toward convergence results from a failure to recognize that the local flexibility and global stability of expert knowledge are flip sides of the same coin. Both are outcomes of a characteristic process of social construction. The raw materials of professional knowledge accumulate in particular organizational settings as people draw comparisons between active challenges and past solutions. Flexible evaluative vocabularies rich in dimensions of comparison and a deep, accessible experience base are essential to this process.

New professional knowledge emerges from situated work when experts in a particular locale formalize and abstract idiosyncratic resolutions to particular problems in order to streamline their work, resolve institutional contradictions, or distinguish themselves from competing professional groups. Rationalization conveys an air of inevitability to highly contingent outcomes of situated work by obscuring alternatives that were not pursued and by shrouding the details of decision-making. Rationalization occurs when solutions for particular challenges are restated as rules of practice, solidified in boilerplate contracts, or codified as statements of abstract principle. In this fashion, contingent answers to specific questions become general statements about the appropriate way to resolve broad classes of problems.<sup>2</sup> Rationalization is not permanent. It is, instead, a step on the road from purely idiosyncratic, local, and effortful standards for problem resolution and evaluation to the field-wide, standardized, and self-replicating practices that are the final outcome of a process of institutionalization (Jepperson 1991).

### The process of institutionalization

Studies oriented to the diffusion and adoption of institutional arrangements have tended to treat the concept as a binary, either  $x$  is institutionalized or it is not. But that approach misses much by obscuring the idea that institutionalization is a process. Thus practices, structures, rules, and conventions can be institutionalized to a greater or lesser degree. In one of the founding articles of institutional theory, Lynn Zucker (1977, p. 726) highlighted this very notion, arguing: “Yet institutionalization is not simply present or absent; ... institutionalization is ... a variable, with different degrees of institutionalization altering the cultural persistence which can be expected.” In other words, there is room to study partial and incomplete processes of institutionalization with the expectation that differing levels of the variable will have disparate implications for the permanence of whatever phenomena one examines. More succinctly, institutionalization is a matter of degree. It supports persistence, but permanence is another matter.

What, though, is the process of institutionalization? Colyvas and Powell (2006) take up just this challenge by defining the process of institutionalization as a feedback loop between the legitimacy of a practice and the degree to which it is taken-for-granted.

The institutionalization of principles and practices initially requires the mindful engagement of individuals in organizations. Our intention is to reveal the manner in which complicated mosaics of routines, categories, and identities are converted into rules of action in particular situations.... Thus, a key metric of taken-for-grantedness is the extent to which practices become embedded in organizational routines and become largely unquestioned (*ibid.*, p. 310).

Notice several features of this description. First, a key step in the move from effortful situation-by-situation action to smoothly institutionalized routine is the abstraction of specific pieces of the institutional mosaic from practices to rules or

<sup>2</sup> While their analytic focus is different, early research in prosecutors' offices (Sudnow 1965), with police officers (Bittner 1967), and in social service agencies (Lipsky 1983) demonstrate similar processes.

conventions. Colyvas and Powell call the result of that process of abstraction legitimacy, which they define broadly in terms of widely shared presumptions about appropriate behavior in particular situations (p. 309). The process of rationalization is one means to legitimate practices by enshrining them in the rules, documents, and procedures that the stock in trade of a particular organizational or professional collectivity.

I focus on the idea of rationalization here because it implies both the beneficial and the constraining effects of standardization and abstraction, something I take to be lacking in Colyvas and Powell's formulation of legitimacy. By treating standardized practice as a double-edged sword, the concept of rationalization allows us to make some inroads to the tension between expert-jurisdiction and neo-institutional conceptions of the professions. When a particular rule or procedure becomes the unexamined consensus answer to the question "What should a person like me do in a situation like this?" we have witnessed a strong case of institutionalization.

Defining the identity of the person and the type of situation they face and drawing the link from that to a standard response is Abbott's process of diagnosis. When identities are stable, situations are clear, and collective expectations are unified, application of a rule or procedure can happen nearly by rote.<sup>3</sup> When identities are in flux, expectations are fragmented or contradictory, or situations are ambiguous, diagnosis becomes more challenging. Under those conditions, professionals must bend their efforts and experience to adapt existing rules and tools to fit particular situations. In the former, stable case abstracted professional knowledge will lead to similar problem resolutions in different locations and contribute to convergence in organizational practices as predicted by institutional theory. In the latter, unstable case, the procedures and practices that get implemented will be more flexible. Differences between organizations may arise depending on the skill and experience of their occupants and their position in the larger field as suggested by expert jurisdiction approaches. Experience with the diagnosis and solution of ambiguous problems, a history of success or status that might support deviations from collective assumptions about appropriateness, and a local language rich in dimensions for the comparison of problems will facilitate greater flexibility in the application of abstract knowledge.

### Black boxes and pidgin languages

Rationalization and the broader process of institutionalization of which it is a part is an organizational and institutional analogue to the "black-boxing" of scientific and technical knowledge (Latour 1987). In the parlance of science and technology studies, black boxes are facts or artifacts that, however controversial or contingent their origins, have become taken for granted enough to be treated as opaque and unproblematic components of later efforts at discovery or design. During the course

<sup>3</sup> It is this sense of professionals as the rote appliers of rules that led Perrow (1986) to equate them with machines. That connection is reiterated, although with a different focus in Pinch's (2008) more recent call for institutionalists to attend to materiality by treating technology as an embodiment of such institutional rules.

of daily work, the internal machinations of a black box need never be considered, only their inputs and outputs. Rationalized rules and procedures play the same role in organizational and institutional life and it is in this sense that they constrain and standardize action. The settlements that create black-boxes in organizations and professions are driven by language and collective effort.

Shared vocabularies are the bedrock of stable institutions (Berger and Luckman 1967) and language is a force for change (Suddaby and Greenwood 2005). Locally sensible dialects, which I call argots, enable interpretive flexibility and create the raw materials of professional knowledge, solutions to pressing problems. An argot is a style of talk characteristic of a particular group or occupation that is created by mixing the components of multiple tongues. Such lexicons are locally improvised rather than designed and thus can vary across otherwise similar settings. While they adopt terms drawn from multiple classification systems and cosmologies, their speakers need adhere to none. I demonstrate here that the language used by licensing officers is a complicated hybrid that combines legal, technical, academic, business, and relational vocabularies in fluid discussions of problems. Licensing talk mobilizes multiple rhetorics, suggesting competing solutions for most problems and highlighting the institutional tensions and professional conflicts that drive rationalization.

### **Knowledge-making and local argots**

Experts often work on ambiguous objects (Barley 1986; Bechky 2003; Fine 2006). This is particularly the case in knowledge-intensive arenas where the very same artifact, case, or problem is commonly amenable to multiple, potentially contradictory, interpretations (Star and Griesemer 1989). Multiplicity and contradiction sometimes stem from differences in the training of overlapping professions (Chambliss 1996; Anspach 1987). In other instances, membership in more informal epistemic communities can lead individuals to read the same situation in divergent ways (Knorr-Cetina 1999; Lave and Wenger 1991). In both cases, people with different backgrounds and social contacts will offer distinct solutions to similar problems because they are steeped in distinct styles of thinking and classification (Bowker and Star 1999), disparate institutional logics (Friedland and Alford 1991), and varied rhetorics of justification (Boltanski and Thevenot 2006).

As a result, discussions of open problems in a collective forum serve teaching and vetting functions in expert work (Anspach 1988; Owen-Smith 2001). Professional authority and personal reputations alike are often on the line in discussions where multiple reasonable solutions exist for any given problem. Thus, collective discussion and decision-making during presentations of problem cases highlights the ways skilled social actors make, use, and refine expert knowledge in practice (Fligstein 2001).

New knowledge, professional jurisdictions, and institutional arrangements all spring from messy processes driven by conflict and negotiation among established interest groups (Latour 1987; Abbott 2005; Stryker 2000). Some of the most fertile ground for thinking about the genesis and use of expert knowledge, then, will be found in situations where: (1) problems are ambiguous; (2) multiple



systems of value or bodies of knowledge offer competing solutions; and (3) no single professional group or language dominates. Such spaces are “interstitial” locations where stable social orders can come into prolonged and generative contact (Mann 1986; Morrill 2006).

Interstitial settings require discretion and can be highly fluid because the people who work in them can mobilize multiple languages to describe and interpret the same set of phenomena. When interstitial settings are home to a knowledge-based occupation, the conditions are set to offer a particularly clear view of professional knowledge-making. Untangling that process requires close attention to the use of competing organizational and evaluative lexicons in efforts to resolve open problems. To the extent that those vocabularies are associated with professional training, particular epistemic communities, or stable organizational forms, the challenge of professional knowledge in the making is a species of a broader problem of coordination.

Peter Galison’s (1997) analysis of the work of high-energy physicists can be extended to analyze how technology licensing officers define, discuss, and resolve problems. Galison’s historical analysis of collaboration and instrumentation highlights the importance of local, cobbled-together languages that borrow from existing knowledge systems without adopting their entire cosmology. Such “pidgin” tongues make stable evaluative vocabularies flexible in local practice. Interpretive flexibility enables coordination of conflicting approaches to the same questions. As Galison (1997, p. 833) notes:

... the ability to restrict and localize symbolic systems for the purposes of coordinating them at the margins is important to the linking of the many subcultures of the discipline of physics. The physicists and engineers at work [in a collaborative environment]<sup>4</sup> are not engaging in translation as they piece together their microwave circuits and they are not producing neutral observation sentences. They are working a powerful, locally understood language to coordinate their actions.<sup>5</sup>

University technology managers also solve problems by mobilizing restricted versions of established lexicons in locally appropriate ways. In short, inference in technology transfer work relies on an argot that draws on multiple evaluative vocabularies but wholly adopts none. This language allows licensing officers to navigate the institutional tensions and overlapping jurisdictions involved in the work of identifying, prosecuting, managing, and licensing intellectual property.

“Licensing talk” helps make challenging problems solvable and thus represents a necessary building block of professional knowledge. Such occupational rhetorics, however, are a profoundly local means for establishing identity and coordinating disparate symbolic systems (Fine 1996). For local languages to yield knowledge that is comprehensible across settings, the outcomes of some inferences must be rationalized. Rationalization transforms local language and experience into abstract professional knowledge that can be easily transferred to and applied in other

<sup>4</sup> MIT’s Radiation Laboratory, a central location for the development of radar systems during World War II.

<sup>5</sup> This solution to problems of differing languages and coordination challenges bears many resemblances to the interdisciplinary review panels observed by Lamont (2009).

locales. Widespread transfer and broad use of professional knowledge cement institutionalization.

### **Technology transfer in academe**

University technology transfer is a big, controversial business administered by a growing occupational group: university technology managers. Their work helps to manage the many tensions that arise at the intersection of academic and commercial approaches to knowledge. Academic technology management is a profession in the making. The occupation's national and local efforts have shaped the trajectory and effects of university research commercialization.

#### The TLO's position in the field

The Technology Licensing Office at Elite Private University is one of the oldest and most successful of its kind. It was founded decades ago, has an enviable record of commercial success and enjoys a positive reputation among local faculty and administrators as well as in the profession at large. In this developing field, work in a small set of high-profile licensing offices is an essential source of expertise. In interviews and casual discussions, technology managers on multiple campuses identify a group of "marquee" offices and directors as leaders in the field.

This office and its director make that list. Staff members have held key positions in the national Association of University Technology Managers (AUTM), routinely teach didactic seminars, and serve as consultants for universities in the United States and abroad. Some have left the office to take positions in industry or at other universities. In addition, the office is overwhelmed with requests for visits, tours, and seminars. In response to the flow of visitors, the staff began to conduct a weekly information session that is open to the public and provides an overview of their procedures. Near the midpoint of my fieldwork, in late 2000, this topic came to head in several discussions in TLO meetings. One interaction between the Director and two veteran licensing associates was particularly telling.<sup>6</sup>

**Director:** I just got a fax from a group of Finnish people who are coming to campus and want to visit the office. This is getting crazy. Groups like this are coming through almost every day. It's taking up a lot of our time. So I wondered what you all would think if we composed a "dear visitors" letter that says OK, you either have to go to the weekly meetings or pay an honorarium for our time. I talked to [Director M]<sup>7</sup> and she has just started saying no to any visitors.

---

<sup>6</sup> In the interests of subject confidentiality, I refer to individuals by a title and differentiate among holders of the same title with numbers. I distinguish among three levels of office hierarchy, identifying the Director, Licensing Associates (the senior members of the office) and Licensing Assistants (entry level members of the staff). Within each title numbers are assigned in the order the individual appears in this article.

<sup>7</sup> The Director of a high profile office at another university.

**Associate 1:** An honorarium is an interesting idea.

**Director:** A good one?

**Associate 1:** No, a weird one. We're being paid to do a job and either part of our job is to talk to the public or it's not.

**Associate 2:** [Waving a diffident hand at me] These people don't want to be here for academic reasons. They are here for financial gain. They want to imitate us.

The issue of honoraria went unresolved, but the discussion is instructive. First, note that members of the office recognize that they are widely imitated and that interested parties from around the world beat a path to their door. More subtly, this interaction suggests that, while the office is not a closed ecology (the Director did consult with her colleague, Director M), decisions rarely stem from imitation of procedures or practices on other campuses.

More is at stake in this discussion than money and public access; it is about the character of a *university* technology manager's responsibilities. Is public dissemination part of the job? Or is it only a part of the job when people like me show an academic interest? The challenges of defining a professional role at the intersection of academic and commercial regimes is apparent here and runs throughout many of the discussions I observed. That very tension marks the sometimes uncomfortable, interstitial position that technology licensing officers occupy as they work to define, market, and manage faculty (and sometimes student) innovations.

### Work in the TLO

When EPU researchers believe they have made a valuable discovery, they may choose to disclose their invention to the TLO. Unlike their counterparts in for-profit settings, university technology managers exert no control over the course of faculty research and have few means to compel the disclosure of inventions. As a result, they are almost totally reliant on inventor's decisions to share their discoveries (Owen-Smith and Powell 2001). Thus, maintaining a good relationship with prolific faculty inventors on campus—"inventor management" in office parlance—is an essential component of licensing work. Inventor management can be particularly challenging when researchers have a strong interest in the eventual disposition of inventions. The Bayh-Dole act vests ownership of intellectual property in the university rather than in the inventor. As a result, faculty members have no legal control over their discoveries. Licensing officers sometimes flout inventors' wishes. Thus, relationships with faculty are a common source of problems. Those conflicts are the ultimate source of many instances of rationalization because licensing officers structure their rules to manage the expectations and inputs of the essential but sometimes challenging inventors.

Once they are received, invention disclosures are used to open docket, which the Director assigns to particular Licensing Associates. Associates and their Assistants have "cradle to grave" authority over technologies assigned to them. They are responsible for updating their docket and deals when new disclosures or licensees

are added to the mix. As a result, staff members routinely cultivate long-standing relationships with the corporations that license their technologies. Those relationships are often mined for information that aids in the evaluation of dockets (Owen-Smith and Powell 2003). Such evaluations culminate in decisions about whether (and how) to apply for intellectual property rights to a particular technology.<sup>8</sup> Like relationships with inventors, ties to licensees are important to office work and a persistent source of problems that require resolution and often lead to rationalization.

Several types of meetings provide opportunities for collective discussion and informal control. These conversations are also occasions for new staff members to learn the tricks of the trade. The office is divided into functional areas called the “Bioteam” and the “Physci” (pronounced “fi-sci”) team. Teams meet weekly. The former focuses on life science innovations while the latter handles physical science and engineering discoveries. In interviews, associates commonly referred to the training function of meetings. As Associate 2 noted, “There is no curriculum for training someone. We try to send people to AUTM [The Association of University Technology Managers], but they are going to learn more by being here on the job.” Another informant, Associate 3, was even more succinct: “You should come to Bioteam. Those meetings are where we learn.” The entire staff also gathers monthly for a review of active dockets and open deals. Monthly meetings are characterized by rapid-fire descriptions of new disclosures and reviews of ongoing negotiations.

All three types of meetings took place in a small conference room one floor below the TLO’s main administrative offices. Every Wednesday morning a group of TLO staffers balance pastries and coffee on bound laboratory notebooks and stacks of contracts as they march downstairs to collectively address the week’s (or month’s) case load. Meetings are mostly scripted. The director, invariably seated at the head of a scarred oblong conference table, proceeds clockwise from staff-member to staff-member. Each reviews her open cases and presents questions, concerns, or successes to the group. This procedure varies little from meeting to meeting, though on one memorable Halloween morning the discussion was held with most staffers decked out in elaborate costumes. Bioteam, Physci, and Monthly meetings are key forums for the discussion of problem cases and their resolution.

### Key tensions in academic licensing

This licensing office manages an impressive volume of disclosures and deals while hewing to an institutional mission that emphasizes revenue generation, service to the public good and the academic community. That mission is “To promote the transfer of [EPU] technologies for society’s use and benefit while generating unrestricted income to support research and teaching.”<sup>9</sup> The tension here stems from the fact that

<sup>8</sup> Patents are the most common form of IP sought by the office. Associates also handle copyrights, tangible materials such as cell lines, and, sometimes, trademarks.

<sup>9</sup> For a more detailed discussion of the contradictions inherent in academic technology transfer and some suggested resolutions, see Nelson (2004).

“society’s use and benefit” is generally taken to be served by ensuring broad, timely, and affordable access to academic technologies through non-exclusive licenses that allow multiple partners to use inventions. While such licenses are sometimes extremely lucrative, another means to generate significant revenues for the university hinges on taking stock in start-up companies. That kind of deal usually requires the university to offer long term exclusive rights to a technology to a single partner.<sup>10</sup>

Consider the following Bioteam discussion. At issue is whether to extend the length of an exclusive license for a firm in which the university owns stock. Exclusive rights to the licensed technology for the life of the patent will make the start-up firm more valuable in the eyes of investors. Long-term exclusivity is thus likely to increase the company’s value and the university’s return when the firm goes public. The patent in question was developed without federal funding, and as a result there are few constraints on how it can be licensed. This snippet of discussion between Associate 2, a long time veteran, and Associate 4, who has worked in the office for more than 5 years, illustrates the trade-off between generating revenue and ensuring public access.

**Associate 2:** This invention wasn’t made with government money. So our goal here is just to make as much as possible. This is how you do that when you hold equity in a company.

**Associate 4:** But we’re also here to get technologies out there for the public good. What if this turns out to be like Jim’s old case and 6 years from now one of your big companies<sup>11</sup> knocks on your door and says “Hey, don’t you guys remember broad access? Why can’t we get our hands on this technology?”

Associates eventually decided not to extend exclusivity unless the company could justify their request based on product development concerns. In other words, the team concluded that long-term exclusivity was not justifiable purely to increase their bottom line. The resolution they reached, though, acknowledged that getting actual products on the market might trump the public benefits of broad access to an early stage technology. The tension between academic vocabularies emphasizing public access and business terminologies focusing on increasing revenues is often palpable. As was the case in this excerpt, problem discussions and resolutions commonly reference local experiences. Note Associate 4’s invocation of a case that Jim, a now retired associate, handled several years ago.

<sup>10</sup> The tension between more open and more proprietary approaches to technology development efforts is not unique to universities. Biotechnology firms, which often manage the tensions inherent in publication and patenting as a means to recruit top scientists (Stern 2004), face this very challenge. The tension between more publicly oriented and more managerial approaches to non-profit organizations is another manifestation of this common dynamic (Hwang and Powell 2009).

<sup>11</sup> Large licensees with whom Associate 2 has maintained sometimes decade-long relationships centered on multiple, non-exclusive licenses.

The Director's tendency to prefer young hires and local training together with a marked aversion to employing attorneys ensures that no single established profession dominates office discussions. The TLO's licensing staff is overwhelmingly young and female. When I began my field work in late 1999 all but four licensing officers were women and the average employee was in her early thirties. Few staff members boasted the formal credentials that are key to traditional sociological definitions of professionals, but many were recognized as national and even international experts in their fields. Their educational backgrounds were diverse. One held a Ph.D. in a life science field. The director and a few associates held masters degrees in engineering or management. Most TLO staff members, however, have a Bachelor's degree in a technical or scientific field and receive the bulk of their training on the job. None of the associates in the office had received any legal training and none had ever held faculty positions at a university. The former is a conscious decision on the Director's part as she explained to me in an interview.

That [the lack of attorneys on staff] was a totally conscious decision. We think of ourselves as a business office. We think that lawyers are trained to be risk averse and so [our founding director] felt strongly against hiring them and I fundamentally agree. We feel that our agreements represent business relationships rather than legalistic ones. Even the good licenses and relationships are going to require modification along the way. We take a much more "Japanese" attitude, which is to say that the license is a starting point in an ongoing relationship, and as the situation changes we can always renegotiate. We renegotiate a lot.

This quotation describes another key tension that shapes TLO work: friction between relational and contractual, or legal, approaches to licensing deals.

Refusing to hire attorneys does not mean licensing officers do not encounter them. The office out-sources its patent prosecutions. Thus associates routinely engage with independent lawyers. Associates negotiate their own deals. They often find themselves across the table from corporate counsel. Associates recognize that they work in an area dominated by lawyers, and they try to distinguish themselves and their approach to intellectual property, contracts, and negotiations from those of attorneys.

The institutional tension between academic and business justifications for deals and the professional tension between relational and contractual approaches to negotiation structure TLO work. Those frictions also bear on the question of how professional knowledge gets made in interstitial contexts. Conflicts between business and academic approaches to dockets and between legal and relational approaches to deals foreground the overlapping and contradictory evaluative terms used in technology transfer discussions. "Licensing talk" provides a rich, hybrid lexicon that associates use to evaluate and coordinate multiple interests as they work to solve problems. After detailing my data collection and coding procedures I present my findings, beginning with an extended example licensing talk and a descriptive survey of discussions that characterize the TLO's argot.

## Data and methods

I observed work in the Technology Licensing Office at Elite Private University for 18 months from November of 1999 to May of 2001. I conducted semi-structured interviews with 11 members of the licensing staff as well as the office's director. In addition, I interviewed 25 academic administrators, faculty members, and students who had interacted with the office. These interviews introduced me to licensing procedures and helped me to situate licensing work on the campus of an elite research institution. I supplemented interview data with archival and organizational material drawn from sources both local (e.g., an annual survey of inventors on campus) and national (e.g., U.S. Patent Office and National Science Foundation data).

Interviews and archival materials provide necessary background for this analysis, but the primary data come from observations of 38 licensing meetings. These meetings are a prime location for training and for the presentation and discussion of problems. Thus, meeting discussions open a window onto collective processes of inference. During meetings, I took copious field notes to capture reports and discussions of new inventions and deals as well as characterizations and analyses of problems arising from them. I kept participation to an absolute minimum in order to facilitate open and detailed note-taking. Notes were elaborated as soon as possible after leaving the field for the day. I also routinely checked my representations and interpretations of discussions with informants in the office.

### Coding of observational data

I coded my notes in multiple stages. First, I identified instances where problem cases were presented and discussed. Problem discussions ranged from short, dyadic interactions to lengthy conversations involving numerous staff members. Initial coding of field notes yielded 120 problem discussions, an average of just over three per meeting.

Each of these 120 note excerpts was then coded as to the disposition of the problem under discussion. Initially I distinguished between cases where problems remained unresolved at the end of the conversation and those in which a conclusion or response emerged from discussion.<sup>12</sup> The bulk (87, or 72.5%) of problem discussions reached some resolution, but a decent proportion (33, 27.5%) did not. Because I take resolutions of open problems to be the raw materials of new professional knowledge, further analysis focused exclusively on the 87 discussions in which problems were presented and resolved.

I next coded these 87 note excerpts to identify instances of rationalization. Three different conversational outcomes reflect rationalization: (1) the restatement of specific problem resolutions as general rules; (2) descriptions of (or calls for)

<sup>12</sup> Some problems were raised several times over the course of my field work. I coded each discussion as an individual instance for the purposes of determining its status.

boilerplate contractual language based on a particular deal; and (3) the abstraction of norms for professional practice from the details of particular cases. I provide several examples of rationalization in the section entitled “Rationalization on the Ground.” In the meantime note that by these criteria 41.4% (36) of resolved problems were transformed into more general rules or tools, a rate of slightly less than once per observed meeting.

I treat rationalization as a persistent but impermanent outcome of contingent social processes and a key step in the process of institutionalization. I expect that some problems that were once resolved will be re-opened at a later date. Likewise, quandaries that went unsolved at one meeting may be successfully addressed later. I take problem solutions to be the wellspring of standard knowledge, but my unit of analysis is the discussion, not the particular problem. Thus if an unresolved issue is revisited and solved at a later meeting, I capture that solution in my notes and it becomes grist for my analysis. Similarly, resolved problems that are later re-opened are included in my analysis provided the discussion reaches either the same or a different resolution. The fact of a particular issue’s resolution or even rationalization at one time does not preclude its reconsideration at a later date.

After identifying resolved and rationalized problem discussions, I turn to detailed coding of evaluative lexicons and sources of rationalization. I drew on interview descriptions of TLO work, my experiences in the field, and open coding of the 87 problem resolution cases to identify five vocabularies that are characteristic of discussions in TLO meetings. Those terms derive from legal, technical, academic, business, and relational approaches to licensing work. I present a long, detailed example of a discussion that features all of these vocabularies in the section entitled “The Argot of Technology Transfer.”

Until then, note that all 87 resolved problem discussions were detail coded in terms of the number and type of vocabularies they mobilized. I did not attempt to characterize a dominant language for each discussion, emphasizing instead the fluidity of inference chains that drew upon and crossed established institutional and professional domains. Finally, I turned my attention to the 36 instances of rationalization. My primary purpose in detail coding these field note excerpts was to identify the source or impetus for their rationalization. I drew upon sociological theories of the professions to make two general distinctions. First, I noted instances where rationalization in the TLO appeared to be driven by forces external to the office. These cases of external rationalization were further divided into the tripartite sources of isomorphism defined by DiMaggio and Powell (1983): mimetic, normative, and coercive.

In addition to coding external pressures toward rationalization, I focus on internal pressures associated with the two key tensions that shape TLO work: between academic and commercial approaches to dockets and between legal and relational rationales for deals. I identify rationalization cases with institutional tensions if a discussion where rationalization occurs could have been resolved in accordance with either business logics associated with the profit motive for innovation, or academic logics associated with the development and broad dissemination of new knowledge.



Likewise, I take rationalization to reflect jurisdictional conflicts if discussions involve competing perspectives or evaluations drawn from legal vocabularies emphasizing contract and risk and relational rhetoric that emphasizes the forbearance characteristic of long-term relationships.

### Standardization and flexibility in licensing talk

The argot of technology transfer

The language that technology licensing officers mobilize as they work reflects their efforts to navigate multiple jurisdictions and regimes. Five broad vocabularies contribute to the office's brand of "licensing talk."

*Legal* vocabularies emphasize contractual obligations in licensing deals and the details of intellectual property rights. *Technical* terms focus on the scientific and engineering features of particular technologies. *Business* approaches emphasize the financial details of deals, marketing concerns, and the characteristics of industries or product markets. *Academic* emphases treat university inventions as extensions of academe's traditional research and teaching missions, highlighting concerns with public access to information, conflicts of interest, and the well-being of students. Finally, *relational* lingo, the most diffuse category, emphasizes the forbearance, trust, and mutual accommodation that are common components of long term relationships (Powell 1990; Uzzi 1996; Macauley 1963). Mixing and manipulation of these rhetorics in a characteristic, locally sensible language is central to knowledge-making in university licensing.<sup>13</sup>

Consider an extended example, drawn from a discussion observed in 1999. In this passage Associate 5 presents a problem involving a new invention by a faculty member who is a prolific inventor, the founder of an eponymous start-up, and with whom she has a longstanding relationship.

Associate 5's summary of her problem (Lines 1–12) is characteristic of the sagas that are commonly discussed in TLO meetings. Her description spans multiple evaluative styles. The faculty member, Inventor K, is a chemical engineer who has won several high profile awards. Inventor K patents prolifically. More than 30 of his patents belong to the university. Nearly ten more belong to his company, K-firm. Inventor K is exactly the sort of faculty member with whom licensing associates develop long and occasionally stormy relationships.

The issue here is what to do with K's newest invention disclosure, which he believes will be very valuable. A number of prior, related inventions from his lab have already been licensed to K-firm. Multiple licenses to a faculty start-up can raise eyebrows among research administrators and trigger questions about conflicts of

<sup>13</sup> These vocabularies bear some resemblance to the six "orders of worth" identified by Boltanski and Thevenot (2006). Like those terminologies, the components of licensing talk can be used to account for action, justify claims and beliefs, and to ascribe value to artifacts or positions.

interest. Associate 5's narrow issue—whether to renegotiate old licensing deals in the course of offering the “hot property” to K-firm—raises questions for the Director and Associate 3.

### Field Note Excerpt 1

1 **Associate 5:** [Inventor K] has some new inventions. They are related to his old  
 2 [chemical compound] patents that are licensed to [K-Firm]. Right now we've got  
 3 a 93 docket and a 95 docket licensed to K-Firm. We also owe them two 98  
 4 dockets under an MTA. Both of those are going to be rolled into a single patent  
 5 application. The inventions he just disclosed are so closely related to the things  
 6 we've already licensed to K-firm that there's some question about whether you  
 7 could actually practice them without a license to the earlier technologies. So we  
 8 didn't think it was worth it to rock the boat, and we've decided to license the new  
 9 inventions to K-firm as well. Inventor K told me he thinks the newest one is going  
 10 to be really hot. So I thought that if we give that to K-firm we could ask them to  
 11 renegotiate the old licenses so we can roll everything up in one deal. I asked K  
 12 what he thought.  
 13 **Director Interrupts:** Is K conflicted?  
 14 **Associate 5 [Laughing]:** K is like the least conflicted guy in the world [she  
 15 motions to her assistant]. When she walked out of our meeting she asked me  
 16 “Who are those K-firm people? It doesn't sound like he likes them very much.”  
 17 **Director:** OK.  
 18 **Associate 5:** K-Firm has been paying our patent costs without the license. K told  
 19 me he thinks upfront and annual payments are going to be small potatoes. So he  
 20 suggested that we try for more milestones because the money will really start  
 21 flowing when they have a product on the market. I think that's right, so I want to  
 22 add a milestone for phase three trials, and fold that into the existing licenses so  
 23 we'll get earned royalties on any product they put out.  
 24 **Director:** Aren't the earned royalties on that pretty low?  
 25 **Associate 5 [flipping through her notes]:** I don't know off-hand because they  
 26 are so complicated. If the patent is developed in K's university lab, then we get  
 27 4%, but if the development work was done at the firm we get 2%, and there are  
 28 conditions under which we get as little as ½ of a percent.  
 29 **Director:** Are these new ones also compound patents?  
 30 **Associate 5:** No, they are methods for making the compounds.  
 31 **Associate 3:** Is there any way to tell when a process is being used?  
 32 **Associate 5:** K can tell.  
 33 **Associate 3:** Are we shopping these around?  
 34 **Associate 5:** No, we just decided not to rock the boat. We are shopping another  
 35 unrelated patent from K's lab.  
 36 **Director:** Why not just ask for equity in the firm?  
 37 **Associate 5:** I did that up front, but it didn't fly.  
 38 **Director:** Try again. Remember, if they don't want to renegotiate, just tell them  
 39 that they have to. I think that after we amend a deal twice it's time to renegotiate

Substantively, their queries cover: (1) Inventor K's potential conflicts of interest (Lines 13–17); (2) the financial and legal features of past and current licensing deals with K-firm (Lines 18–28); (3) the technical details of the patents

(Lines 29–32)<sup>14</sup>; (4) and whether the new invention has been broadly marketed, “shopped,” to determine if other parties might be interested (Lines 33–35). All five of the evaluative vocabularies I identify are represented in this complex discussion.

Legal vocabularies emphasize contractual obligations: “we also owe them two 98 dockets under an MTA,<sup>15</sup>” and details of patent prosecution in Lines 2–3. Relational terms are most notable in Associate 5’s decision “not to rock the boat” with K-firm and in her reliance on Inventor K’s expertise (Lines 8–10). The Director’s concern with potential conflicts of interest (Line 13) and Associate 3’s queries about the breadth of marketing (Line 33) evince worries about public access and the challenges of balancing faculty and business roles that characterize academic concerns. The discussion is shot through with business talk, but note particularly Lines 19–20, where financial concerns take on a relational tinge. Here Associate 5 reports Inventor K’s sense of the docket’s market value and turns that input into a negotiation strategy aimed to increase EPU’s royalties. Finally, technical rhetoric appears in questions about whether use of the patented process can be detected (Lines 29–32).

This example documents a local process of case description, inference, and problem resolution. Three experienced staff members mobilize multiple, competing terminologies to address a complex problem. One of the most relevant to the issues at hand, legal rhetoric, is downplayed as they articulate a solution that emphasizes neither contractual obligations nor the risk of lawsuits. Instead they settle on a solution that emphasizes relational give and take, “I think that after we amend a deal twice it’s time to renegotiate.” The Director’s final statement (Line 39) is one of many rules of thumb that routinely aid in resolving office problems. In the next section I take up the issue of how such rules crystallize.

This example is not unique in its complexity as nearly 14% (12) of the discussions I witnessed engage all five evaluative languages. A relatively small proportion (17 of 87, 19.5%) of observed discussions are unitary and mobilize only one rhetoric. When a single language does dominate a conversation, it is most often legal (11 of 17, 64.7%). The office’s simplest discussions, then, invoke and respond to language of contractual obligations and statutory constraints that characterize the professionals whom staff members recognize as rivals. The remaining problem discussions involve between two and four of the lexicons I identify, suggesting that the mobilizing of multiple, alternative logics in problem resolution is the norm in this office.

<sup>14</sup> I code the discussion of whether infringement can be detected as an instance of “technical” language because identifying another’s use of one’s proprietary technology is a separate matter from the strength or breadth of legal rights to an invention. In this case, the docket’s potential value is increased because Inventor K has devised a particular scientific assay that can determine when the patented process was used in the creation of a final product. Here the combination of legal rights and technical capacities together raise the value of a docket.

<sup>15</sup> An MTA is a “Materials Transfer Agreement.” MTAs are common legal mechanisms to enable the transfer of proprietary research materials, in this case a particular chemical compound, between organizations.

## Rationalization on the ground

I take situated inference to be the wellspring of new professional knowledge. For locally appropriate solutions to specific problems—such as the one posed by Inventor K’s new patent—to become abstract, transferable bits of professional expertise, they must be rationalized. Rationalization occurs as fleeting combinations of languages that yield temporary solutions to problems are stripped of the context and conflicting interpretations that characterize the cases and discussions from which they arose.

When abstracted and stabilized—as rules, boilerplate contracts, or norms for practice—contingent, negotiated resolutions to specific and complicated quandaries become black box solutions applicable to entire classes of problems. It is these abstract solutions that become components of larger system of professional knowledge and, in so doing, help to define and defend characteristic professional approaches, identities, and jurisdictions. In that sense, the processes I observe are very much about defining how *university technology managers* should do things.

Consider a conversation I observed during another Bioteam meeting. At issue is the question of whether to grant a 1-year option<sup>16</sup> on a technology to a potential licensee. The secondary question centers on the terms of the option. Associates three and four are not the office’s most experienced employees, neither are they neophytes. Both have more than 5 years’ experience and have worked on numerous option contracts. Knowledge is being transferred from more to less experienced players in this discussion, but new rules and standards are being articulated in the process.

**Associate 4:** I’ve got a new docket from a dermatologist who’s been collaborating with Skin-co. He’s found a new way to use some of their compounds, so they’ll be co-owners. I sent them a letter asking them if they want a license.<sup>17</sup> They want us to file a provisional<sup>18</sup> and to wait a year to see how things develop. So should I do an option, say in exchange for patent costs? They want a letter saying we’ll guarantee them a license for a year.

**Director:** My feeling is that we should get something for that. If the question is to give them an option for nothing or do one for 5 K, I’d get the cash or tell them they can’t have the year.

**Associate 3:** So don’t shop it?

**Director:** Just let it sit. If someone else comes along we can license it to them then.

**Associate 4:** So the verdict is that you have to pay us some cash to reserve rights for yourself?

**Associate 3:** Yeah.

<sup>16</sup> While there is a huge technical literature on options and option pricing in this case it is sufficient to know that an option represents a guaranteed right of first refusal to a technology for some limited time period.

<sup>17</sup> Even though Skin-Co will formally have an ownership stake in the patent, EPU could license rights to use the technology to a competitor. One way for Skin-Co to prevent that would be to take an exclusive license from EPU.

<sup>18</sup> A provisional patent application is means to establish a priority date with the U.S. Patent Office without paying the cost of a full patent prosecution. Provisional applications must be converted to regular patent applications within 1 year.

I take this discussion to be an instance of rationalization because it features both the resolution of a problem case (Skin-Co's prior agreement to pay patent costs is not a sufficient consideration for a 1-year option) *and* the restatement of that particular solution as a more general rule for an important class of deals, options ("You have to pay us some cash to reserve rights for yourself.").

It would be remarkable indeed if technology licensing officers were just discovering the value of option contracts in 1999 when I observed this conversation. That was not the case. I am not arguing that this instance of rationalization represents the creation, *de novo*, of a new approach to options. Instead, this excerpt documents the ways in which a single, unique case can lead to a change in practice that is reified as a broader rule of thumb. In this TLO, options were commonly traded for a potential licensee's willingness to pay patent costs (which can run from \$10,000 to over \$30,000). This case of rationalization makes cash payments a component of license options in addition to patent costs.

The resolution of this particular discussion is clearly appropriate to the particular case of Skin-Co. The docket in question was collaboratively discovered and relies on Skin-Co's proprietary compounds. As a result, the firm co-owns the technology and controls the materials that are necessary to use it. Thus, it is highly unlikely that another company will license the docket.

Skin-Co agreed to pay patenting costs prior to its request for an option, but its desire to file a provisional patent makes the bill negligible. Provisional applications are cheap, and if "things don't develop" they can simply be abandoned after a year. As a result, paying for the patent is less than a compelling consideration for an exclusive option.

As it turns out, the university dermatologist published his findings before a patent application could be filed. Such public disclosure makes it legally impossible to seek foreign patent rights and places a 1-year bar on domestic patent applications. Waiting a year without filing a provisional would ensure that Skin-Co will have no intellectual property protection if the discovery turns out to be valuable. The same pressures mean the university will have nothing to license if another firm expresses interest down the road.

In short, Skin-Co is trying very hard to hedge its bets on this technology and to minimize the costs of doing so. The Director wants to make them pay a fee for the office's help. These features of the case are essential to understanding its resolution. They disappear entirely, however, from the more general rule that Associate 4 states and Associate 3 acknowledges. That rule takes an appropriate answer to a question about a particular deal and makes it a working standard for a common class of deals, options, regardless of their particularities.

If this rule were to be followed slavishly, all options contracts would require cash payments in addition to patent costs. Such an arrangement might be inappropriate for deals with different characteristics. Cases where the firm held no ownership rights, where multiple licensees bid for an option, or where the costs of filing for U.S. and foreign patents were large, might require a different deal. Micro-level processes of rationalization abstract components of a professional toolkit away from the details of their origins, thus streamlining work and increasing the generality of rules at the possible expense of fit with the needs of new situations.

Rules such as the one articulated by Associate 4 are commonly used in the office.<sup>19</sup> Repeated use contributes to their growing taken-for-grantedness and institutionalization as black boxes. Also common are efforts to streamline work by creating boilerplate contracts that can be used across classes of deals. Another example of rationalization demonstrates how similarities across deals are built into standard contracts that can be downloaded and signed as is by licensees. Like their more informal cousins, rules of thumb, boilerplate contracts are easily transferred to other locations and do not bear clear traces of their origins. Like the physical embodiments of institutional rules in technologies (Pinch 2008), standard contracts give a material form to rationalized occupational know-how.

Consider field note excerpt 2. In this discussion, the resolution of a problem drawn from experience with one kind of material transfer agreement (for a genetically engineered mouse, Lines 6–9) appears in a description of a new boilerplate MTA (for a cell line) that is presented in a meeting 2 weeks later (Lines 16–17).

#### Field Note Excerpt 2

- 1 **Director:** Are the mice agreements getting more standard? Should we gin up a ready-to-sign?  
 2 **Assistant 1:** They are getting more similar, but there are often clauses that big companies want  
 3 taken out. I think it's a big company lawyer thing, because most of the deals I've signed have  
 4 taken work.  
 5 **Director:** If you allow them to negotiate, then they will, but their changes are often pretty  
 6 piddling.  
 7 **Assistant 1:** Most of the problems seem to involve self-insurance. These are really big  
 8 companies, so they mostly insure themselves.  
 9 **Director:** Just change the clause to allow the company to self-indemnify if they have assets over  
 10 \$1B.  
 11 *Two weeks later*  
 12 **Assistant 2:** We were just talking about how we need to create a boilerplate deal for those mice.  
 13 **Director:** That's something we're still working on.  
 14 **Assistant 2:** Well, we just finished one for [a cell line] that went online today.  
 15 **Director:** Didn't we just sign Genecorp to that? Can you describe what you did with that  
 16 contract?  
 17 **Assistant 2:** It's a boilerplate 2K per line deal. A few of the inventors are from [an independent  
 18 research institute], so we had to add in the stuff they require. We also put in some stuff for big  
 19 companies, like the clause that says you can self insure if you're worth more than \$1B. The  
 20 instructions we put up with the contract say that contacting us to negotiate different terms will  
 21 result in a \$2,000 up front increase plus an extra \$1,000 for each additional line.

Licensing associates often transpose solutions from one problem to another. Here a kind of feedback occurs where the resolution to a problem with one kind of agreement appears in a standard contract that then serves as a template for a “ready-to-sign,” boilerplate version of the initial deal. Office efforts to respond rationally to a high volume of deals and the constraints imposed by particular kinds of partners yields increasing homogeneity in approaches to even simple agreements.

The similarity between this situation and a common sociological view of organizational fields where “individual efforts to deal rationally with uncertainty and constraint often lead, in the aggregate, to homogeneity in structure, culture, and output” (DiMaggio and Powell 1983, p. 64) is striking. In such fields, professional

<sup>19</sup> Recall The Director's invocation of another such rule in the discussion of Inventor K's new invention.

norms (normative isomorphism), imitation (mimetic isomorphism), and regulation (coercive isomorphism) are the primary mechanisms driving increasing homogeneity. These pressures are felt in the TLO, but here rationalized professional knowledge is also generative. It provides a flexible tool-kit for problem solving (Swidler 1986) by the people who create and use these professional tools. That interpretive flexibility stems from the multiple languages, local comparisons, and contested resolutions that characterize office discussions. Argots rich in evaluative terms offer skilled actors room to move. Maintaining that flexibility depends on the group's ability to access discarded alternatives and the back-stories that underpin rationalized components of their practice. In other words, when it is easier for individuals to open the black boxes of formalized rules and contracts to recover the particularities of their origins, professional knowledge can contribute to organizational flexibility by enabling discretion and improvisation in responses to new situations.

Consider a final field note excerpt drawn from a 2001 Physci team meeting. Associate 2, a key player on both physci and bioteam deals, presents a case involving a common type of deal: a license back to the inventor (LBI). At issue is the question of how to handle a technology with both software and hardware components. Licenses back to inventors are a common means for the office to facilitate faculty start-ups (in this case, "Eyeware") and often include some amount of equity in the company. LBIs are common enough that a boilerplate version exists, but idiosyncratic and relationally freighted enough that it is often modified.

### Field Note Excerpt 3

- 1 **Associate 2:** I want to tell them [a pair of faculty inventors] to take [their invention] and get  
2 what they can out of it. They want a license back to do a start-up.
- 3 **Director:** Didn't Professor M do something like this a while ago?
- 4 **Associate 2:** Now that I think about it, this is like Professor M's, X-tech thing. So maybe we  
5 should give them the same type of license we gave those folks? My gut feeling is that equity  
6 won't amount to much in this case. Maybe this is more like Search-Co. They have a new startup  
7 and you can buy a product. The problem is there's really no commercial interest in the thing,  
8 even with the prototype. When they wanted to do a startup so I just tweaked the standard LBI  
9 [License Back to Inventor], got a little equity, a 1% royalty, and patent costs. That would have  
10 worked if Search-Co didn't rely on a software invention. Our LBIs mostly deal with patents, so  
11 we ended up generating a hybrid license that they didn't like. Now we've settled on two, a  
12 standard license on the software and a separate license back for the patent. It's a pretty good  
13 deal that's worth keeping in mind because it looks like a lot of our boilerplate, but there are some  
14 important differences.
- 15 **Associate 4:** Does Eyeware really want separate licenses, or are they trying to cut down on  
16 royalties?
- 17 **Associate 2:** They are trying to avoid royalties. The real value here is in the patent claims on the  
18 hardware, but they need the software to actually do anything.
- 19 **Director:** As long as the deal includes the holy clause, I don't see a reason not to add it to our  
20 list.
- 21 **Associate 2:** Is the holy clause in the standard LBI? [flips through a contract] There it is, but  
22 doesn't it only cover certain technologies? Don't we have a list somewhere?
- 23 **Associate 4:** That list was left over from Search-Co. Those guys worked with so many different  
24 advisors that we kept a long list of folks who might be practicing the invention even though we  
25 didn't really know what the technology was.
- 26 **Associate 2:** OK, I'll base it on Search-Co. We'll do 6% with 10K up front, all the standards.  
27 Quick and easy.

In this discussion, Associate 2 and the Director propose a pair of possible models (Lines 3–6) for the Eyeware deal. The Director’s suggestion, “Professor M’s X-tech thing,” is quickly discarded because that license was written on the assumption that X-tech stock would be highly valuable. Associate 2 believes that Eyeware stock will never really “amount to much.” Associate 2 then shifts from a business-based comparison to a more technical evaluation that suggests another EPU start-up, Search-Co, as a possible model. He proceeds (Lines 7–15) to elaborate on the details of the Search-Co license and its similarities to the Eyeware case.

In the remainder of the discussion, Associate 4 raises a question about the inventor’s goals (Lines 16–17), and the Director agrees that the Search-Co deal could be a useful addition to the TLO’s list of model contracts, provided that it includes the “Holy Clause,” a contractual provision widely disseminated through AUTM that reserves the right for the university to use its patented technologies for academic purposes (Lines 20–21). That comment triggers Associate 2’s search of the standard LBI and raises a question about the form the research exception takes. Associate 4 (Lines 24–26) notes that the decision to list researchers who worked with inventors rather than particular technologies was “left over” from the Search-Co deal and, with a final link between Eyeware and Search-Co drawn, Associate 2 decides to use the latter deal as a “quick and easy” model for the former. The length and complexity of this discussion, though, suggests that settling on an appropriate model requires collective skills that are neither quickly nor easily mastered.

The situation here is ambiguous, rendered difficult to classify by the combination of hardware and software technologies on the table. In response to that ambiguity, associates collectively tinker with potentially appropriate solutions. Comparison across deals is essential to that process and implies the importance of a deep local experience base. More interesting, though, is how local experiences are used to open up the black boxes of boilerplate contracts (the LBI) and exemplary licenses (X-tech and Search-Co). Rather than rote application of an established model, this discussion emphasizes accessible experience as a source of flexibility in the adaptation of a highly rationalized deal. In offices that draw their boilerplate arrangements from outside sources, that lack a sufficiently high volume of deals to enable multiple comparisons, or that are unable to access local rationales for particular agreements, I would expect to see much less fluidity in discussion and much greater homogeneity in the application of established models.

### Interpretive flexibility and the sources of standardization

Do the external mechanisms identified by institutional theory drive rationalization inside this technology licensing office? I find evidence of mimesis, the force of professional norms, and the traces of regulation. Nevertheless, the predominant means by which rationalization occurs is local and driven by serial comparisons between an “open” problem and previously resolved cases. Associates articulate similarities between problems and solutions along dimensions defined by one or more of the vocabularies that contribute to the office’s patois. In this licensing office, efforts to adapt already rationalized knowledge to fit new problems leads associates to unearth its hidden features. Those features, I suggest, are much more difficult to access when rationalized knowledge is drawn from outside the local context. Of



course the TLO's size, age, and record of success make it an exemplary case. As a result, I speculate that external pressures toward rationalization are likely to be felt more weakly here than in other, less influential offices. That, however, is the point if one believes that knowledge developed in high-prestige locations within a field is apt to diffuse more broadly than incremental innovations from the margins (Strang and Soule 1998)

External sources of rationalization are apparent in the TLO, but they are relatively rare. In 3 of the 36 rationalization cases I observed "mimetic isomorphism" as EPU associates explicitly drew arrangements and practices in other university technology licensing offices into their own work.<sup>20</sup> Consider the Director's acknowledgment of the source of a particular clause in a monthly meeting: "This clause comes from Director M [at another university licensing office]. I think it's a good idea, so I'm including it in our policy." Such direct imitation is rare in this office because of its status in the growing profession, its emphasis on local training, and negotiated, relational solutions to problems.

This office, like the select few from which it borrows, is a net exporter of professional know-how. The organization's visibility, high volume flow of deals, and importance in the larger field mean that associates share more practices with distant colleagues than they borrow from them. Indeed, visitors, consulting opportunities, and responses to other offices' "best practice" queries became so onerous and time consuming during my stay in the TLO, that the director made plans to produce a DVD of associate interviews and case studies to be marketed with a CD-rom containing all of the office's boilerplate contracts and forms. That "educational package" has, by all reports, sold well despite a price tag well north of \$1000. In offices where less local expertise, a lower volume of deals, or a strong need to justify decisions to external constituencies shapes decision-making more strongly, I would expect greater reliance on imitation as a means to reduce uncertainty and signal legitimacy.

A more common spur to formalization is an appeal to the norms of practice and ethics that are being developed by the Association of University Technology Managers (AUTM). Six of 36 the rationalization cases I observed drew explicitly upon norms of professional practice. The most common examples surround efforts to ensure a research exemption for academic uses of licensed technologies. To that end all TLO deals include the "holy clause" that was invoked in the discussion of Eyeware's LBI (field note excerpt 3). Despite the relatively frequent role that professional considerations play in local rationalization processes, AUTM exerts much less force than more established professional societies. Both legal training and bar association membership, for instance, involve more stringent and explicit normative standards. Were the office staffed more heavily by attorneys, I would expect a greater reliance on normative professional standards in discussion.

Regulatory changes akin to coercive isomorphism also drive standardization in local practices and, I suspect, homogeneity across technology transfer operations. The largest proportion of "external" cases of rationalization results from the coercive

<sup>20</sup> In some instances multiple codes applied to the same discussions (as when an external regulatory change sparked local comparisons in an effort to determine an appropriate response). As a result the numbers I present in this section sum to more than 36.

work of regulators, judges, and funding agencies such as the National Institutes of Health (NIH). Nine rationalization cases involved some degree of external pressure brought to bear by regulatory or legislative bodies. The most common external pressures involved minor changes to patent law, decisions in high-profile court cases, and the shifting administrative policies of funding agencies. The latter is particularly clear in the Director's introduction of a problem that sparked much discussion and an instance of rationalization during a monthly meeting:

The NIH says that provisional patents don't meet the requirements of Bayh-Dole. The government knows that provisional patents are important to us, but the statute's definition means that only non-provisional U.S. applications count as initial applications under Bayh-Dole. So, meeting those requirements basically means we have to stop filing provisionals.

The ensuing discussion articulated rules for when to file provisional applications and when to convert them to regular applications. External pressures such as changing regulations or statutory interpretations exert similar force upon all academic technology transfer offices, but it is often the case that such changes require articulation in particular organizational settings and validation by outside adjudicators before they are broadly adopted (Edelman et al. 1999).

Imitation, the importation of professional standards, and regulatory change did impact the making of professional knowledge in the technology licensing office. However, the overwhelming majority of rationalization instances (23, 63.9%) were characterized by fluid comparisons drawn across deals that were done locally. Such discussions are exemplified by the Eyeware deal discussed in Field Note Excerpt 3. In other words, most professional knowledge-making in the office is local and comparative. When faced with a new problem, licensing officers' most common tactic is to delve into local experience to define an appropriate solution.

When rationalized knowledge emerges from such comparative efforts, it bears an invisible stamp not only of the particular features that made a solution seem appropriate to a problem but also of the organization in which the process takes place. Recall, for instance, the Skin-Co option negotiation (Field Note Excerpt 2) that made cash payments a reasonable, appropriate component of that particular deal. The specific features that made cash plus patent costs sensible in the context of Skin-Co disappeared in the articulation of a general rule about licensing options. I suggest that those particularities might account for difficulties in applying the new rule to option deals whose features differ from those at work with Skin-Co.

The ability to open the black box to access the particularities that underpinned a given decision allows rationalized professional knowledge to contribute to interpretive flexibility in some settings. That contribution occurs because the presence of well defined standards (e.g., the "standard" LBI in excerpt 3) provides associates with a yardstick that helps them identify and concentrate on interesting or anomalous cases. Once such identifications have been made, local knowledge (for instance about the exemplary, X-tech and Search-Co contracts in excerpt 3) becomes a component in a tool-kit for developing an appropriate resolution to the problem. Note that Associate 2 did not look far as he sought an answer to his question, but alternative models were raised and discarded. When the features of knowledge that are obscured by rationalization can be unearthed on the fly (as when

Associate 4 explained the rationale for a particular implementation of the holy clause in Field Note Excerpt 3), rationalized professional knowledge serves not to stifle, but to discipline improvisation. Thus, partially institutionalized rules and tools can guide innovation, contributing to heterogeneity and social change while still maintaining some continuity in practices across time and locations.

In contrast, where rationalized bits of knowledge are more difficult to unpack (for instance, because of physical, temporal, or social distance from their source) and are simply implemented, they may poorly fit the complexities of particular problems. While access to the TLO's standard agreements may allow other university technology managers to recognize problems that would be anomalous *for this office*, simple access to rationalized rules and tools need not enable skilled improvisation. When expert workers lack insight into the particularities that shaped a piece of abstract knowledge, they may be more likely to apply it by rote, or merely symbolically. Indeed, none of the externally driven instances of rationalization that I observed featured the sorts of fluid comparisons that characterized problem resolution in the TLO.

A similar professional tool-kit makes organizations or units in the same field of endeavor appear similar. In some settings, such as the office I studied, access to the stories behind the rules turns standardized knowledge into a tool for improvisation. Surface homogeneity within a field, then, obscures important differences in the character of expert work. Local, extemporaneous inference in the face of new problems occurs in most work,<sup>21</sup> but its effect will be to separate local practices from the emerging standards of the field if it happens in spite of rather than with relevant formal knowledge. When impromptu solutions are enabled and disciplined by flexible rule and tools, in contrast, local work can bolster and expand professional knowledge and jurisdiction.

### **Professional knowledge as a source of convergence and flexibility**

This article begins with a question and a tension. Where does professional knowledge come from? I argue that new knowledge is forged through practice as occupational argots are mobilized and problem solutions rationalized in the interstices of existing institutions and professions. More specifically, professional knowledge emerges from situated efforts to resolve complex problems. Resolving problems in locally appropriate ways requires the mobilization of a lexicon that draws upon but does not wholly adopt the logics, rationales, and classification systems of competing professional and institutional parlances. Such argots are a means to coordinate multiple interests because their use renders established, stable knowledge systems malleable at their margins. That malleability suggests that new professional knowledge is most likely to emerge from work in locations, like the TLO, that are interstitial, routinely deal with ambiguous objects, and are not dominated by “native” speakers of any single professional or institutional jargon.

<sup>21</sup> See, for instance, Orr's (1996) discussion of the improvisations of technicians, or Becker et al. (1977) examination of the inference efforts of medical students, or Lipsky's (1983) characterization of the ways in which street level bureaucrats “wing” solutions to uncommon problems.

Within such settings, vibrant, locally understood evaluative rhetorics offer skilled social actors multiple ways to frame problems as well as numerous dimensions along which to draw comparisons. Fluid comparison is central to problem resolution. Rich comparative terminologies and a deep, accessible experience base greatly facilitate inter-case comparisons and aid efforts to craft fitting, defensible solutions.

The problem resolutions that spring from such hybrid vocabularies are profoundly local. They bear the stamp both of the organizational locations where they were created *and* of the inferential processes by which they were reached. Occupational argots that span multiple evaluative rhetorics suggest many appropriate solutions for any given problem. A problem's final disposition is thus contingent on local concerns and standards of appropriateness rather than upon its objective characteristics (Cohen et al. 1972). The same problems can be solved in disparate ways in different organizational settings or in the same location at different points in time. As a result, problem resolutions are only the precursors of professional knowledge, which must, by definition, be abstract and general.

Thus, it is necessary to understand how specific, often ad hoc solutions become general, abstract knowledge. That trick is accomplished through a micro-process of rationalization that transforms answers to specific questions into solutions for classes of problems. In this fashion, the normal ways of doing business in particular times and settings become normative standards of practice that can span contexts and time periods. Professional knowledge is an emergent structure that both constrains and enables certain types of action and meaning-making.

In the TLO, rationalization creates professional knowledge through the elaboration of general rules, boilerplate contracts, and standards of practice. That process is sometimes driven by external pressures. Far more often, however, it results from efforts to manage tensions at the intersection of academic and commercial institutional logics and to assert a professional identity distinct from that of attorneys. Institutional contradictions and professional rivalries drive the rationalization of local experience, but we might expect the salience of institutional alternatives and professional competitors to vary across times and places.

Both the precursors of professional knowledge and the process that transforms some of them into black-box components of expertise are shaped by local pressures that may make them ill-fitting solutions to even very similar problems encountered in other settings. Yet the abstraction and transposability of rationalized expertise necessarily obscures the contingencies that shaped it, which brings us to the analytic tension.

Two important and, I think, largely complementary sociological approaches to the professions highlight abstract expert knowledge. For one school of thought expertise is source of autonomy, discretion, and power, which supports interpretive flexibility in professional work and results in the adaptation of professional knowledge to fit particular settings and solve novel problems. Another approach to the professions famously makes exactly the opposite claim, arguing that the work of established professions results in organizational homogeneity and the separation of daily practices from abstract norms and rules. Rather than resolving this tension in favor of one theory or the other, my findings articulate a way to understand both

views to be true and necessary to a robust theory of institutional and organizational action.

The key is the idea that, in some circumstances, standard rules and tools can contribute to interpretive flexibility and the possibility of innovation in response to pressing problems. In other situations, though, the same abstract knowledge can exert normative pressure on organizational procedures and, in its implementation, drive innovation underground by de-coupling daily practice from professional rules and standards. The difference between those two situations, my work in the TLO suggests, lies in the ability of experts to open the black box of abstract rules and tools and perhaps in the legitimacy of their efforts to do so.

Where boilerplate contracts and abstract rules can serve as starting points in the TLO's efforts to resolve novel problems, my focus on the importance of deep and accessible experience suggests that the very same contracts and rules will have different effects when applied in other parts of the field or by associates who, for whatever reason, cannot recover the origins of the rules and tools they seek to apply. Where pressures to appear legitimate in the face of external constituencies are strong or where disappointing results require ongoing justification of tactics, close, visible adherence to established rules and practices will likely trump efforts to improvise even when changes might yield improvement. More importantly, efforts to innovate from established professional knowledge may flounder without access to the back story that underpins particular contracts and rules.

Rather than representing a failing of theory, then, our complicated view of expert knowledge reflects a broader challenge in the study of social systems: the tendency of established arrangements to look stable and constraining macroscopically and in cross-section while appearing flexible and generative in microscopic focus and across time. The micro-institutional view I develop here offers one possibility for explaining how local flexibility and global stability in practices connect and where variations might occur. Thus, I suggest, close attention to the early stages of the institutionalization process in a single, substantively important, and theoretically fertile setting has broader implications for theories of social and institutional change.

First, variations in the process and effects of a particular change may hinge on the internal differentiation of fields as well as their temporal and structural sources of novelty (cf. Phillips and Zuckerman 2001; Strang and Soule 1998). Second, institutional contradictions and jurisdictional conflicts may drive change, but they do so through local processes that transpose and adapt existing solutions across cases and regimes (cf. Clemens 1997; Schneiberg and Clemens 2006). Third, language and performance are central to the generation and transformation of new routines, knowledge, and forms (cf. Suddaby and Greenwood 2005; Feldman and Pentland 2003), but the flexibility of expert rhetoric and constraints on performance are variable. Fourth, the strength and resilience of knowledge systems and classification schemes may depend more on their diversity and ambiguity than upon their purity and clarity (cf. Powell et al. 2005; Galison 1997; Latour 1999). Finally, if the difference between isomorphism and divergence has to do with local practices surrounding the use of institutionalized bits of knowledge, then more effort should be made to address the ways in which skilled people work in and with their institutional and organizational contexts.

**Acknowledgments** I am indebted to the director and staff of the TLO for their time, patience, and willingness to educate a sociological observer. The Director was also kind enough to provide comments and corrections on a draft of this article. This research was supported by the National Science Foundation (Grant # 0097970, Grant # 0545634) the Merck Foundation (EPRIS Project), the National Center for Ecological Analysis and Synthesis Working Group on Scientific Collaboration, and an Alfred P. Sloan Industry Studies Fellowship. My thinking has benefited from conversations with Renee Anspach, Bill Bridges, Michael Cohen, Jeannette Colyvas, Gary Fine, Tom Gieryn, Michael Kennedy, Howard Kimeldorf, Matt Kraatz, Mark Mizruchi, Cal Morrill, Pam Popielarz, Woody Powell, Susan Silbey, Laurel Smith-Doerr, Diane Vaughan, Marc Ventresca, John Walsh, and Mayer Zald (channeling Morris Janowitz), the Editors and reviewers at *Theory & Society* as well as from responses to presentations at the University of Illinois at Urbana-Champaign, the University of Illinois at Chicago, the James Martin Institute at Oxford University, the University of California at Irvine, and the 2007 Institutional Entrepreneurship conference held at Cornell. Any remaining errors are wholly my own.

## References

- Abbott, A. (1988). *The system of professions: An essay on the division of expert labor*. Chicago: University of Chicago Press.
- Abbott, A. (2005). Linked ecologies: States and universities as environments for professions. *Sociological Theory*, 23, 245–274.
- Anspach, R. R. (1987). Prognostic conflict in life-and-death decisions—the organization as an ecology of knowledge. *Journal of Health and Social Behavior*, 28, 215–231.
- Anspach, R. R. (1988). Notes on the sociology of medical discourse: the language of case presentation. *Journal of Health and Social Behavior*, 29, 357–375.
- Armstrong, E. A. (2002). *Forging gay identities: Organizing sexuality in San Francisco, 1950–1994*. Chicago: University of Chicago Press.
- Barley, S. R. (1986). Technology as an occasion for structuring—evidence from observations of CT scanners and the social-order of radiology departments. *Administrative Science Quarterly*, 31, 78–108.
- Barley, S. R. (2008). Coalface institutionalism. In R. Greenwood et al. (Eds.), *The sage handbook of organizational institutionalism* (pp. 491–518). New York: Sage.
- Barley, S. R., & Tolbert, P. S. (1997). Institutionalization and structuration: studying the links between action and institution. *Organization Studies*, 18, 93–117.
- Bechky, B. A. (2003). Object lessons: workplace artifacts as representations of occupational jurisdiction. *American Journal of Sociology*, 109, 720–752.
- Becker, H. S., Geer, B., Strauss, A., & Hughes, E. (1977). *Boys in white: Student culture in medical school*. New York: Transaction.
- Berger, P. L., & Luckman, T. (1967). *The social construction of reality*. New York: Anchor.
- Binder, A. (2007). For love and money: one organization's creative and multiple responses to a new funding environment. *Theory & Society*, 36, 547–751.
- Bittner, E. (1967). The police on skid row: a study of peace keeping. *American Sociological Review*, 32 (5), 699–715.
- Boltanski, L., & Thevenot, L. (2006). *On justification: economies of worth*. Princeton: Princeton University Press.
- Bowker, G. C., & Star, S. L. (1999). *Sorting things out: Classification and its consequences*. Cambridge: MIT.
- Brint, S. G. (1994). *In an age of experts: The changing role of professionals in politics and public life*. Princeton: Princeton University Press.
- Brint, S. G. (2002). The rise of the practical arts. In S. G. Brint (Ed.), *The future of the city of intellect* (pp. 231–259). Stanford: Stanford University Press.
- Chambliss, D. F. (1996). *Beyond caring: Hospitals, nurses and the social organization of ethics*. Chicago: University of Chicago Press.
- Clemens, E. S. (1997). *The people's lobby: Organizational innovation and the rise of interest group politics in the United States, 1890–1925*. Chicago: University of Chicago Press.
- Cohen, M. D., March, J. G., & Olsen, J. P. (1972). Garbage can models of organizational choice. *Administrative Science Quarterly*, 17(1), 1–25.

- Colyvas, J., & Powell, W. W. (2006). Roads to institutionalization. *Research in Organizational Behavior*, 21, 305–353.
- Cziarniawska, B. (1997). *Narrating the organization: dramas of institutional identity*. Chicago: University of Chicago Press.
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48, 147–160.
- DiMaggio, P. J., & Powell, W. W. (1991). Introduction. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 1–40). Chicago: University of Chicago Press.
- Edelman, L., Uggen, C., & Erlanger, H. S. (1999). The endogeneity of legal regulation: grievance procedures as rational myth. *American Journal of Sociology*, 105(2), 406–454.
- Espeland, W. N., & Stevens, M. L. (1997). Commensuration as social process. *Annual Review of Sociology*, 24, 313–343.
- Ewick, P., & Silbey, S. S. (1998). *The common place of law*. Chicago: University of Chicago Press.
- Feldman, M. S., & Pentland, B. J. (2003). Reconceptualizing organizational routines as a source of flexibility and change. *Administrative Science Quarterly*, 48(1), 94–118.
- Fine, G. A. (1996). Justifying work: occupational rhetorics as resources in restaurant kitchens. *Administrative Science Quarterly*, 41(4), 90–115.
- Fine, G. A. (2006). Shopfloor cultures: the idioculture of production in operational meteorology. *Sociological Quarterly*, 47, 1–19.
- Fine, G. A. (2007). *Authors of the storm: meteorologists and the culture of prediction*. Chicago: University of Chicago Press.
- Fligstein, N. (2001). Social skill and the theory of fields. *Sociological Theory*, 19(2), 105–125.
- Friedland, R., & Alford, R. R. (1991). Bringing society back in: Symbols, practices, and institutional contradictions. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 232–266). Chicago: University of Chicago Press.
- Friedson, E. (1988). *Professional powers: A study of the institutionalization of formal knowledge*. Chicago: University of Chicago Press.
- Galaskiewicz, J. (1985). Professional networks and the institutionalization of a single mind set. *American Sociological Review*, 50, 639–658.
- Galison, P. L. (1997). *Image and logic: A material culture of microphysics*. Chicago: University of Chicago Press.
- Garfinkel, H. (1967). *Studies in ethnomethodology*. Englewood Cliffs: Prentice Hall.
- Guetzkow, J., Lamont, M., & Mallard, G. (2004). What is originality in the social sciences and humanities? *American Sociological Review*, 69(2), 190–212.
- Hallett, T. (2010). The myth incarnate: recoupling processes, turmoil, and inhabited institutions in an urban elementary school. *American Sociological Review*, 75, 52–74.
- Hallett, T., & Ventresca, M. (2006). Inhabited Institutions: social interaction and organizational forms in Gouldner's *Patterns of Industrial Bureaucracy*. *Theory & Society*, 35, 213–236.
- Hwang, H., & Powell, W. W. (2009). The rationalization of charity: the influences of professionalism in the non-profit sector. *Administrative Science Quarterly*, 54, 268–298.
- Jepperson, R. (1991). Institutions, institutional effects, and institutionalism. In P. DiMaggio & W. W. Powell (Eds.), *The new institutionalism in organizational analysis* (pp. 143–163.) Chicago: University of Chicago Press.
- Khurana, R. (2007). *From higher aims to hired hands: the social transformation of american business schools and the unfulfilled promise of management as a profession*. Princeton: Princeton University Press.
- Knorr-Cetina, K. (1999). *Epistemic cultures: How the sciences make knowledge*. Cambridge: Harvard University Press.
- Kunda, G. (1991). *Engineering culture: Control and commitment in a high-tech corporation*. Philadelphia: Temple University Press.
- Lamont, M. (2009). *How professors think: Inside the curious world of academic judgment*. Cambridge: Harvard University Press.
- Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Cambridge: Harvard University Press.
- Latour, B. (1999). *We have never been modern*. Cambridge: Harvard University Press.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Lipsky, M. (1983). *Street level bureaucracy*. New York: Sage.

- Lounsbury, M., & Glynn, M. A. (2001). Cultural entrepreneurship: stories, legitimacy, and the acquisition of resources. *Strategic Management Journal*, 22, 545–564.
- Macauley, S. (1963). Non-contractual relationships in American business: a preliminary study. *American Sociological Review*, 28(1), 55–67.
- Mann, M. (1986). *The sources of social power*. Cambridge: Cambridge University Press.
- March, J. G., & Olsen, J. P. (2008). The logic of appropriateness. In M. Moran, M. Rein, & R. E. Goodman (Eds.), *The Oxford handbook of public policy* (pp. 689–708). Oxford: Oxford University Press.
- Mckenna, C. D. (2006). *The world's newest profession: management consultants in the 20th century*. Cambridge: Cambridge University Press.
- Merton, R. K. (1987). 3 fragments from a sociologist's notebooks—establishing the phenomena, specified ignorance, and strategic research materials. *Annual Review of Sociology*, 13, 1–28.
- Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: formal-structure as myth and ceremony. *American Journal of Sociology*, 83, 340–363.
- Morrill, C. (2006). Institutional change through interstitial emergence: The growth of alternative dispute resolution in American law, 1965–1995. Forthcoming in W.W. Powell & D. L. Jones (Eds.), *How institutions change*. Chicago: University of Chicago Press.
- Nelson, R. R. (2004). The market economy, and the scientific commons. *Research Policy*, 33(3), 465–471.
- Orr, J. (1996). *Talking about machines*. Ithaca: Cornell University Press.
- Owen-Smith, J. (2001). Managing laboratory work through skepticism: processes of evaluation and control. *American Sociological Review*, 66, 427–452.
- Owen-Smith, J. (2003). From separate systems to a hybrid order: accumulative advantage across public and private science at research one universities. *Research Policy*, 32, 1081–1104.
- Owen-Smith, J., & Powell, W. W. (2001). To patent or not: faculty decisions and institutional success in academic patenting. *Journal of Technology Transfer*, 26(1), 99–114.
- Owen-Smith, J., & Powell, W. W. (2003). The expanding role of university patenting in the life sciences: assessing the importance of experience and connectivity. *Research Policy*, 32, 1695–1711.
- Owen-Smith, J., & Powell, W. W. (2008). Networks and institutions. In R. Greenwood et al. (Eds.), *The sage handbook of organizational institutionalism* (pp. 596–623). New York: Sage.
- Perrow, C. (1986) Complex organizations: a critical essay. New York: Random House.
- Phillips, D. J., & Zuckerman, E. W. (2001). Middle status conformity: theoretical restatement and empirical demonstration in two markets. *American Journal of Sociology*, 107(2), 379–429.
- Pinch, T. (2008). Technology and institutions: living in a material world. *Theory and Society*, 37(5), 461–483.
- Powell, W. W. (1990). Neither market nor hierarchy: network forms of organization. *Research in Organizational Behavior*, 12, 295–336.
- Powell, W. W., & Colyvas, J. (2008). Microfoundations of institutional theory. In R. Greenwood et al. (Eds.), *The sage handbook of organizational institutionalism* (pp. 276–298). New York: Sage.
- Powell, W. W., White, D. R., Koput, K. W., & Owen-Smith, J. (2005). Network dynamics and field evolution: the growth of interorganizational collaboration in the life sciences. *American Journal of Sociology*, 110(4), 1132–1205.
- Sahlin, K., & Wedlin, L. (2008). Circulating ideas: imitation, translation, and editing. In R. Greenwood et al. (Eds.), *The sage handbook of organizational institutionalism* (pp. 218–242). New York: Sage.
- Schneiberg, M., & Clemens, E. S. (2006). The typical tools for the job: research strategies in institutional analysis. *Sociological Theory*, 24(3), 195–227.
- Silbey, S. S. (2005). Everyday life and the constitution of legality. In M. D. Jacobs & N. W. Hanrahan (Eds.), *The Blackwell companion to the sociology of culture* (pp. 332–346). New York: Blackwell.
- Stern, S. (2004). Do scientists pay to be scientists? *Management Science*, 50, 835–853.
- Strang, D., & Soule, S. A. (1998). Diffusion in organizations and social movements: from hybrid corn to poison pills. *Annual Review of Sociology*, 24, 265–290.
- Stryker, R. (2000). Legitimacy processes as institutional politics: implications for theory and research in the sociology of organizations. *Research in the Sociology of Organizations*, 17, 179–223.
- Suddaby, R., & Greenwood, R. (2005). Rhetorical strategies of legitimacy. *Administrative Science Quarterly*, 50(1), 35–67.
- Sudnow, D. (1965). Normal crimes: sociological features of the penal code in a public defender's office. *Social Problems*, 12(3), 255–276.
- Swidler, A. (1986). Culture in action: symbols and strategies. *American Sociological Review*, 51(2), 273–286.
- Uzzi, B. (1996). The sources and consequences of embeddedness for the economic performance of organizations: the network effect. *American Sociological Review*, 61, 674–698.



- 
- Van Maanen, J., & Barley, S. (1984). Occupational communities: culture and control in organizations. *Research in Organizational Behavior*, 6, 287–365.
- Weber, M. (1978). *Economy and society*. Berkeley: University of California Press.
- Wilensky, H. L. (1964). The professionalization of everyone? *American Journal of Sociology*, 70, 137–158.
- Zucker, L. (1977). The role of institutionalization in cultural persistence. *American Sociological Review*, 42, 726–743.

**Jason Owen-Smith** studies how science, commerce, and the law cohere and conflict in contemporary societies and economies. Together with collaborators, Owen-Smith works on projects that examine the dynamics of high-technology industries, the commercialization of academic research, and the science and politics of human embryonic stem cell research. He seeks to understand how organizations, institutions, and networks can maintain the status quo while generating novelty through social transformations, scientific discoveries, and technological breakthroughs. Owen-Smith is an Associate Professor of Sociology and Organizational Studies at the University of Michigan, where he has worked since 2002.