

Discipline-Making and Organizational Permeability of the University

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DISCIPLINE-MAKING AND ORGANIZATIONAL PERMEABILITY OF THE UNIVERSITY: DISCUSSING THE NOTION OF ORGANIZATIONAL FIELD

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ABSTRACT:

Close interaction between universities, industries and governments has given rise to hybrid organizations incorporating economic development alongside scientific research and higher education. We will approach this phenomenon and the related organization-theoretical problems by looking at two cases of discipline making to discuss the potential of the concept of organizational field introduced by the neoinstitutionalist school of organization theory. As this concept presumes the Bourdieusian theory of social fields, we will consider possibilities of reflective contesting of the *states of doxa* in discipline making in regard to organizational aspects of disciplinary boundaries in the university-centered system of higher education, its demarcation to business and schooling, as well as to the related ideology of professionalism and science policy. We will also comment on the Bourdieusian conceptuality inscribed in the neoinstitutionalist metaphor of organizational field from the perspective of systems theory inspired by Luhmann. This is because we believe that further development of the semantic focus in the problem of disciplinary boundaries would benefit from Luhmannian tools designed to grasp organizations as social systems that facilitate interrelations of differentiated function systems relevant for discipline making in current technoscience.

KEYWORDS:

1. discipline
2. organization
3. university
4. systems theory
5. Bourdieu
6. neoinstitutionalism

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Introduction

Research in science, technology and innovation studies as well as higher education research asserts that a significant change has taken place in the organization of science and universities. Etzkowitz (2008; 1998), for instance, claims that closer interaction between universities, industries and governments has given rise to a new kind of research that no longer seeks primarily to advance scientific knowledge but conveys commerciality as well. According to this view, the increasing overlap between the three institutional spheres of society (i.e., the triple helix of academy, industry and government relations) has brought forth an entrepreneurial university, a hybrid organization incorporating innovations for economic development alongside the established coupling of scientific research and higher education. The notion of so-called Mode 2 knowledge production (Nowotny, Scott & Gibbons, 2001) has fostered a similar hypothesis, stating that research problems are no longer pursued within the academic community alone, but rather in close collaboration with external actors. This parallels the transformation of the university into a “stretched” organization responding to the needs of the economy and other societal institutions (Nowotny et al., 2001, p. 79–94).

All these perspectives promote a view according to which a significant change has taken place in the university organization and its environments. They also point to the need for an organization-theoretical discussion about ways of describing the envisioned hybridity or increasing permeability between different institutional logics of the societal missions of the university. Such concern entails conceptual and theoretical issues with consequences for the formulation of research problems and the methods used to address them. In this conceptual contribution, we will approach this organization-theoretical problem by focusing on the notion of discipline, which in the modern university binds together the institutional logics of education and science. Inspired by Gieryn’s (1999) research on the cultural boundaries of science, we will investigate the analytical potential of the concept of organizational field, introduced by the neoinstitutional school of organization theory (see Hasse & Krücken, 2008).

The neoinstitutionalist notion of organizational field was inspired by Bourdieu. Therefore, we will discuss it based on questioning the clarity of the Bourdieusian perspective on societal differentiation but focusing on the specificity of a scientific field and its internal and external demarcation in university-related discipline making. We will cross-examine this theoretical issue from the differentiation-theoretical viewpoints based on Luhmann’s system-theoretical legacy. Thus, our aim is to identify a specific point in Bourdieusian theorization that would be useful for making sense of the hybridity of the university as concerns discipline making. Inspired by Gieryn’s (1999, p. 15–17) notion of the rhetoric genres within the “universe of credibility contests”, we will point to Bourdieu’s considerations of reflective contesting of the *states of doxa*. We will also relate this discussion to disciplinary struggles by referring to our previous analyses of the organizational aspects of disciplinary boundaries in the university-centered system of higher education and its demarcations to business (Tuunainen, 2005a) and schooling, as well as to the related ideology of professionalism (Kantasalmi, 2010, 2014) and science policy (Kantasalmi, 2015). By so doing, we show that the neoinstitutionalist notion of

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organizational field overestimates the ease of permeability of different institutional logics as manifest in the thesis of organizational isomorphism (DiMaggio & Powell, 1983).

We will argue that the organizational field is an inspiring metaphor, which, by drawing upon its Bourdieusian background, deserves further elaboration for the specification of boundaries in discipline making. This will require, however, focusing on a rather unusual Bourdieusian conceptuality enabling an analytical breakdown of the “*silence of doxa*” (Bourdieu 1991b, p. 131), and observing the dynamics conditioned by reflexivity sprouting tensions between *orthodoxy* and *heterodoxy* and *alldoxy* and *paradoxy*. Furthermore, we will suggest that this point in Bourdieu’s work deserves more consideration as regards the theorization of the boundaries in discipline making. To this elaborative end, we will consider contested boundaries as being free from the presumed primacy of culturally dominating field positions and the utilitarian subjects that impregnate Bourdieu’s conceptuality. We will argue, in contrast, that animating the tilted states of doxa for the analytical description of the boundaries in discipline making requires the complementary potential offered by Luhmann’s conceptuality (for such comparisons, see Nassehi & Nollman, 2004).

By complementarity, we mean switching between the conceptualities in order to better grasp the boundary problems related to discipline making. The Luhmannian viewpoint acknowledges only communications as sources for communicative events, which we observe and portray as we continue the processes of making disciplines. The latter are the basic units in the internal differentiation of the societal system of science, i.e., differentiated institutional spheres or Bourdieusian fields. Albeit structurally coupled to the system of higher education, disciplines in the modern university organize themselves according to the societal functions of science and thereby narrow down the scope of research questions. The advantage of viewing the global society as being constituted by communication, and thus positing human irritations to the environments of out-differentiated societal communication systems, lies in the strict marking of the boundaries between the inherent logics (*Eigenlogik*) of the differentiated functional communication formats. For example, science is in many ways coupled with education, but its internal communication is in the first place not didactical, as is the external communication in teaching.

In the following, we will first consider the neoinstitutionalist notion of organizational field and elaborate on it by means of pointing to the need to clearly distinguish between the concepts of institution and organization. We will then examine the potential of the concept of organizational field and illustrate its limitations via illustrative case examples of the creation of disciplinary boundaries. We argue that the analysis of the boundary work of discipline making would benefit from the systems-theoretical elaboration of the semantics and structure in the silence of doxa. While focusing on the topic of communicative boundaries, we will recognize the potential of the Bourdieusian conceptuality, but suggest timely switching to systems theory in order to better understand the forms of disciplinary boundary maintenance within the university. In our view, disciplines function as a form of structural coupling between the

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systems of science and higher education, thus enabling management of the external performance expectations in their respective environments while keeping with the logic inherent in science.

In our illustrative cases, we will view the historical stabilization of disciplinary demarcations as a permanent concern of the societal domain of modern science. In addition to rhetorical strategies and tactics of agents engaged in boundary work, we are interested in discipline formation and the relational transformations of disciplines within the university. Our first case comes from the development of Finnish educational sciences in the historical context of evolving teacher professionalism (Kantasalmi, 2010, 2014) and the second from the transformation of plant production research in the face of technological pressures (Tuunainen, 2005b). Regarding the educational sciences, we will demonstrate the importance of the extended social space of the university for discipline making in which the scientific (research) and academic fields (schooling) intersect. Concerning plant production, the analysis will highlight a series of disciplinary struggles within the context of a university department that experienced fundamental changes in its research orientation during a period of expanding use of new biotechnological methodologies. The former case will draw upon the context of the broadening welfare state before the 1980s, while the latter will represent the beginning of the emphasis on innovation policy during the 1990s. Both cases illustrate our argument according to which the concept of organizational field provides an unclear conceptualization of things that could be described more sensitively in systems-theoretical terms. That is, by viewing organizations as systems that, from the point of view of their communication and observation operations, define their relevant reference problems and demarcates their relevant environments.

Organizational field and boundary problems in discipline making

A splendid metaphor for locating theoretical problems in boundary processes

In the neoinstitutionalist analysis of organizations, similar ideas to the ones presented at the beginning of this article have arisen in relation to university-industry relationships. In their study on intellectual property rights in science, Powell and Owen-Smith (1998) discuss the mechanisms that have blurred the division of labor between industry and academia in the life sciences. Similarly to the triple helix thesis (Etzkowitz, 2008), the authors claim that the three realms of society – government policy, business strategy and university research – have become interdependent with one another, resulting in a collapse of the clear institutional separation of these societal areas. This has caused an increase in interorganizational collaboration especially in knowledge-based areas, such as life sciences (e.g., Powell, Koput, White & Owen-Smith, 2005; Owen-Smith & Powell, 2004), and led to an internal transformation of the university into a hybrid organization (Owen-Smith & Powell, 2001; Owen-Smith, 2006; also Colyvas, 2007). Furthermore, this transformation has brought forth a new kind of institutional hybridity, which not only increases contradiction within the university but produces strong complementary relationships and positive feedback loops across commercial and academic applications of science (Owen-Smith, 2003, 2006).

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A prime example of the transformation of the university organization is Stanford University, which was among the first to introduce technology transfer mechanisms in academia. As discussed by Colyvas (2007), this transformation started at the beginning of the 1960s with considerable experimentation around different possibilities of commercializing scientific findings. The commercial engagement of scientists, however, also caused confusion and led to conflicting conceptions about the issue. Later on, however, the contradictions were settled, interpretations were standardized and proper organizational procedures to govern the behavior were established.

In contrast to research underlining external pressures that permeate the boundaries of the university and lead to commercialization, Colyvas' study is interesting as it pays attention to the normative order of science, which provides room for divergent local interpretations of the issue. The eventual codification of the organizational policies associated with commercialization was thus a result of an interplay between external industrial concepts, such as those of patenting and inventorship, and internal institutional logics of academic science. The so-called Stanford model of technology transfer thus emerged from what Powell and Colyvas (2008) call the microfoundations of institutionalization: local enactment, translation and interpretation that gives rise to broader institutional forces that eventually evolve to guide daily organizational practices. The study thus demonstrates a rare attempt in neoinstitutionalism to analyze how the micro-processes of institutionalization intermingle with macro-pressures to result in an altered social order in an organization.

When it comes to traditional neoinstitutionalist research, the growing institutional isomorphism in an organizational field refers to the process whereby organizations become similar to other units operating in their immediate environment. This process involves three major mechanisms: 1) coercive isomorphism resulting from pressures exercised on organizations by other organizations and cultural expectations of the society, 2) mimetic isomorphism, which refers to organizational imitation in the face of internal and external uncertainties, and 3) normative isomorphism, which stems from increasing professionalization either in the form of formal university education and the legitimation it produces, or through professional networks that facilitate the quick distribution of new models (DiMaggio & Powell, 1983, p. 150–154). Organizational fields, in turn, are regarded as a configuration of organizations “that, in aggregate, constitute a recognized area of institutional life” (DiMaggio & Powell, 1983, p. 148). The field thus refers to the totality of relevant actors, such as key suppliers, consumers, regulatory authorities and other organizations that produce similar kinds of services or products. Once structured into a field engaged in common activities, organizations become subject to regulatory and reputational forces that make them become homogeneous with one another. Further, emanating from the adoption of the concept of field from Bourdieusian sociology (Powell et al., 2005), the structure of the field cannot be determined theoretically a priori, “but must be defined on the basis of empirical investigation” (DiMaggio & Powell, 1983, p. 148). Within each field, there is thus a distinctive order of relations that in the neoinstitutionalist tradition has been addressed by using the concept of network (e.g.,

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Powell, Koput, Smith-Doerr & Owen-Smith, 1999; Powell et al., 2005; Owen-Smith & Powell, 2004; 2006; Owen-Smith, Riccaboni, Pammolli & Powell, 2002).

One would think that the concept of field as attached to the term “organizational” would be an indication of adopting the Bourdieusian notion of strategic action or relationally constituted agency, but this has hardly been the main intention of neoinstitutionalism. Instead, the emphasis on grasping the institutional environment of organizations, such as the university, seems central. Further, in the notion of the organizational field, the distinction between organization and institution does not always remain clear. In our view, Luhmannian differentiation-theoretical considerations might facilitate, even better than Bourdieusian field differentiation, the understanding of the stabilizations and destabilizations of the structuration of disciplinary orders in the sciences. After all, neoinstitutionalist discourse on organizational change has inscribed the sociologically rather underdeveloped notion of institution to the more developed theory of organizations. In the 1970s, neoinstitutionalists also deployed the “world cultural approach” to provide a macroscopic explanation of the expansion of schooling (Meyer, Scott & Deal, 1983; Meyer, Ramirez & Soysal, 1992; Boli, 1989), including tertiary schooling (Ramirez, 2006, Meyer, Ramirez, Frank & Schoffer, 2007). Bluntly stated, their claim was that differentiated macro-societal entities, such as nation states and their school systems, transcend their organizational boundaries and become permeable – almost by osmosis, in the words of Dale (2000) – by means of assuming transnational cultural characteristics that evolve from ideologically based programs, such as the Euro-American model of mass schooling.

The thesis of isomorphism: easy institutional permeability and unproblematic organizational hybridity

The notion of organizational permeability, hypothesized by the neoinstitutionalists (Owen-Smith & Powell, 2001; Owen-Smith 2006; Colyvas 2007), leads us to inquire as to the concrete historicization of locally observable organizations instead of mere concern over the semantics of national policies responsive to global discourses. Such *glocalization* calls for careful consideration of the main theme inscribed in the notion of organizational field, i.e., to take seriously Baker’s (2006, p. 182) call for “sorting out the difference between institutionalization versus organizational implementation within an institutional sector”. In other words, there is a need to better grasp the relevance, or effects, of other organizations and their interrelations in the environment of the organization under scrutiny, e.g., the ones with relevance to disciplinary structures within the university. Thus, the notion of organizational field opens up the theoretical problem of how to conceptualize the institutional in connection to Bourdieu’s model of the differentiated societal fields – academic schooling and scientific research – while simultaneously adhering to the notion of the organization, the university. The probable effects on the organizational boundaries depend on the forces in the environment of the university, but how can one conceptualize such penetrating external forces if the university is considered the focal field?

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The neoinstitutionalists have in other words introduced a splendid metaphor to inspire theoretical regulation and sensitization of the empirical observation of the permeability of organizations, but in our view, working through it might require the application of less-known Bourdieusian conceptuality in order to resolve the unclear demarcation of the field of science and tertiary schooling during discipline making. Therefore, we will insist on holding to the concept of organization with regard to the university. In order to better grasp its permeability, we will experiment with the notion of the field while referring to the societally differentiated institutional environment of the university. Bourdieu studied many differentiated institutional fields of practices, but the general logics behind such societal differentiation remained unclear in his thinking. His starting point was often in demarcating a field in terms of identifying the powerful dominating position in the social space – a concept confusingly close to the notion of field – defining the conditions of access to that field as well the rules and assets deployable in the field. Even though Bourdieu wanted to substitute the notion of profession by his theory of field, most of his empirical fields appear to be institutionally established branches within the societal division of labor, implying mono-professional culturally dominant positions. In our view, more convincing theorizing of the societal differentiation is needed in order to elaborate the analytical potential of the notion of organizational field to provide a better grasp of the theoretical problem of organizational permeability and the related topic of hybridity.

In differentiation-theoretical terms, Luhmannian conceptuality offers a clearer basis for demarcating societal systems from one another. This means that the focus of observation is on boundary maintenance of the systems and the related process performances. This point of departure will allow us to locate the relevant communality of boundary concerns in Bourdieusian and Luhmannian conceptualities. We will not pursue eclecticism between the strategic utilitarian action-based Bourdieusian understanding of the social and the Luhmannian primacy of communication in the understanding of it. Instead, we believe that Bourdieusian theorization of logics and reasons of social practices will include tools that can help to explain not only the cultural reproduction of the doxa, which marks the disciplinary boundaries, but also allows their transformation via reflective practices included in the forms of heterodoxies contesting the disciplinary orthodoxy. In this analysis of field-inherent experiences, the concepts of paradox and allodoxy can offer additional analytical light.

Distinctions looming in the silence of doxa: Luhmannian reflexivity offers a step forward

The above-mentioned conceptual arsenal comes close to certain Luhmannian viewpoints on how a societal system (e.g., science) maintains its functional boundaries within the all-encompassing communications in the system of society. It does so by means of its code, which distinguishes between truth and untruth, and with the help of the variety of its programs that enable scientific performance to be stretched to technology, etc. The radically contingent society is extensively served by science, but, with its system-specific formula for contingency – a canonized principle of *limitation via negations*, *Limitationalität* (Luhmann, 1990, p. 396), –

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science regulates its reflection performances to support its boundary-maintenance while gaining new societal ground, e.g., through innovation. This means assuming a limited number of possibilities should science claim that by deploying a truth/untruth distinction it is reducing rather than increasing the range of questions to be scientifically examined (Luhmann, 2012, p. 282 fn.113, p. 434). In this perspective, we find support for the theoretical problem mentioned above: the evolution of ideas within institutional or organizational changes can be encompassed within either a Luhmannian or Bourdieusian viewpoint.

As the basic units of differentiation within science, disciplines can also function as structural couplings to the system of education as typically organized in the university. In short, there is much more to this overlapping institutional zone than Bourdieu (1988a) recognized. He located the disciplines inside the faculty structure and placed emphasis on presumptions of dominance; on the sense of the utilitarian power game and deployment of field-specific assets, i.e., forms of capital. We thus continue to ask: Which is the focal field – academic, including schools other than the university, or scientific, including organizations other than the university and its faculties – and what is in its environment?

In Luhmann's view, modern society is functionally differentiated into autonomous communication systems. These systems continue self-reproduction of their unique communication formats as operationally closed to their respective environments while simultaneously observing problems pertinent to their particular functions in society. Society, in turn, is conceived in terms of a particular social system, which contains all possible communications; that is, a world society with nation-states as its subunits (Pfeffer & Stichweh, 2015). In Luhmann's perspective, the societal functions of systems, or their codes of communication, do not conflate with one another, nor do such systems communicate directly with each other. Organizations, as social systems, process decisions and offer *structural couplings* through which function systems can *irritate* (i.e., surprise, stimulate, disturb etc.) each other's *autopoiesis*, which refers to the self-referential selectivity in the self-generation of the communication by means of its own elements. Bourdieu (2004, p. 33), too, views that scientific capital, as a form of symbolic capital, "acts in and through communication". However, his notion of reflexivity, which offers a connection for considering fields, both as spaces of meanings and power relations (Bourdieu & Wacquant, 1992, p. 103), appears to be limited to the "socio-analysis" of the person analyzing the field in question. Luhmann, in turn, would suggest focusing on the evolution of function system-specific reflection theories and, above all, on the special semantics produced in the processual reflexivity of the problem-system specific communication and observation.

Couplings of function systems within organizations imply *translations* between different communication formats. Thus, systems theory conceives economic and political institutions as external to science. The prime *societal function* of the scientific discipline is to guarantee the "address" for the internal communication of science and for external knowledge expectations; thus, discipline is also the primary unit of the internal differentiation of science and

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scholarship, or *Wissenschaft* (Stichweh, 2001, 2003, 2013; Luhmann, 1990, p. 446–68). Further, disciplinary structure relates processes that in science studies have been conceptualized as connective “transepistemic arenas of research” (Knorr Cetina, 1982) or understood in terms of differing identities in “boundary work” (Gieryn, 1999). In the Luhmannian view, such processes can be *irritated* by economic and political communication, and thus it is an empirical task to clarify translations of the communication formats in such encounters that have bearing on organizational decision-making. In the current university, there is an increasing need to sharpen meaningful distinctions that could enhance the description of the nature of complex boundary controversies or the possibility of coexistence of different institutional logics (Murray, 2010; Upton & Warshaw, 2017), i.e., the prophesized hybridity and isomorphism between universities and their societal environments. These kinds of influences can be conceptualized as structural couplings between autonomous social systems and their self-constructed environments. This perspective suggests that one should observe how the social system of science (or education) transcodes external issues and influences into topics of its own, or, vice versa, how scientific results become translated into forms that are useful, say, in the economy, via patenting and licensing.

Luhmann’s conceptuality offers various tools for grasping the interdependency of societal systems as they condition discipline making within the university and the system of higher education. There is, however, a point in the Bourdieusian perspective that comes close to this. As regards the stability of disciplinary boundaries, we point to the reflective breaking of the *silence of doxa*; to the variety of *doxic experiences* (Bourdieu, 1984, p. 471, 1998, p. 56–57, 80–81) that are generated in tensions of disciplinary structuration between the field of science (Bourdieu, 1975, 1991a, 2004) and the academic field (Bourdieu, 1988a). Thus, discipline making within the university is not to be grasped only in reference to research but also with regard to education and schooling.

Ways forward

The theoretical issue under concern here is how to grasp the structuration of disciplinary boundaries and their organizational permeability in the university and make sense of the overlapping of *faculty* as an organizational category of the academic field with wider range of actor classifications, e.g., those of teachers, researchers, students, administrators and technicians. Whereas *discipline* can be taken as a central organizational category in the field of science, faculty appears central to tertiary education. Bourdieu (1988a) views these two fields as mutually permeating. We will take this as a demonstration of the conceptual problems associated with grasping the dynamics between the logic of practices in schooling (academic field) and research (scientific field). There is, however, a more general ambiguity in the relationship between the social field and social space. If these two are not synonymous, the latter must be a more abstract construction than the former, presumed for the analysis of the field (Müller, 1992, p. 342–343). This is observable, for instance, with respect to the “field of tertiary education”, which can be understood first as being composed of any nation’s “space” of “institutions of higher learning” and second as a “subfield” of any university organization, whatever

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its structure of disciplines, faculties and their members (Bourdieu, 1988b). In other words, by pointing to the distinctions between the concepts of social space versus social field, society versus organization as well as institution versus social field, we accentuate Bourdieu's (1988b) call for caution in constructing a theoretical object that governs an empirical one.

Pursuing changes in internal power relations in a field implies an accumulation of tensions, contradictions, or conflicts around the taken for granted doxa, and the "doxic experiences" of the agents involved. Such experiences must be enacted in and through communication, including non-verbal. The analytical field is thus supposed to be constructed through individuals as agents, i.e., carriers of capital, and as such, to be constituted by the prerogatives of the field, which must be operative focus of the research (Bourdieu & Wacquant, 1992, p. 106-107). This means enacting power via the agent's capacity to capitalize cultural distinctions, precision of significations, consistence of thinking, and sharpness of arguments, within the *doxa*. This explains why Bourdieu (1975, 1988a, 2004) sees that it is impossible to ignoring education and schooling as significantly related to struggles over disciplinary fields. In doxic experiences, not only the contrast between orthodoxy and heterodoxy, e.g. mainstream vs. avant-garde, has importance. Additionally, one must acknowledge the importance of "misplaced credence", say, the erroneous view of one's researcher identity in uncertain inter-disciplinary areas, i.e., *allodoxia*, such as the agent's multidisciplinary position (Bourdieu, 2004, p. 15, 31). One could also think of paradoxes as sources for subversive experiencing of the *doxa*, e.g., bold counter-positioning in a situation of crisis, which might have an effect of "heretical break" (Bourdieu, 1991b, p. 128-9; also Müller, 1992, p. 303-307). In short, the dimensions mentioned above, i.e., heterodoxy-orthodoxy and paradoxy-allodoxy, could be taken as suggested by Müller (1992, 2014, p. 149-153) as typological sketches worth developing in order to systemize the effects of breaking with the *doxic experiences*; in our case, the latter being reproduced in the core of the disciplinary struggle, say, in the dominance of the mainstream.

We have argued above that in instances where boundaries are marked, a two-way permeating process becomes likely. In our view, analyzing reflexivity performances helps to pinpoint transformative potential in instances where different logics of forces in the field external to the university (e.g., policy programs, occupational expectations, entrepreneurial interests) are likely to become internally tilted in the silence of doxa (Bourdieu, 1991a, p. 19-20). Reflexivity then is needed to overcome the constraining subjugation of heterodoxy by orthodoxy or the annihilation of the experiences of paradoxy or allodoxia, say, by indifference or cognitive limitations (ideology, intolerance, etc.) in disciplinary reflection and processual reflexivity of the discipline's dissenting externalities. Accordingly, external impulses could be internally mobilizing, e.g., in successfully reducing orthodoxy and via gaining space of reflection for shaking the doxa due to the accumulation of experiences of paradoxy and allodoxia.

We thus agree with Bourdieu's (2004, p. 33) view according to which scientific capital, as a form of symbolic capital, "acts in and through communication". However, we take this to the limits of the Bourdieusian notion of reflexivity in viewing the transformative struggles, which

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offer a connection for considering fields both as spaces of meanings and power relations (Bourdieu & Wacquant, 1992, p. 100–107). The relevant conceptual instance for rethinking reflexivity obviously lies not in pre-reflexive aspects of “habitus”, and probably not in capitalizing on the fine distinctions in taste or eloquence of petty bourgeois academic manners, but rather in the transformative potential looming around the field specific “*silence of doxa*”.

By developing the above-mentioned Bourdieusian conceptual tools in connection with the neo-institutionalist concept of organizational field, we might also grasp the tensions that potentiate the destabilization of the tilted state of doxa, typical of reproduction of symbolic orders in the particular field of forces in discipline making. In such situations, the Bourdieusian view would focus on power mediation whereas the Luhmannian conceptuality would lead to specifying whether effective transformations of different communication formats occur, meaning the connectivity of communication and the ongoing of its autopoiesis.

In what follows, we will illustrate that working through the metaphor of organizational field by means of switching conceptualities designed to tackle the emergent processes of social differentiation might be fruitful in describing organizational permeability. Rethinking the Bourdieusian conceptuality is of importance, because his preponderance of domination has led to the emergence of widely used tools for explaining the likeliness of social reproduction instead of transformation. Whereas Bourdieu treats power and domination in terms of strategic action and assumes forms of symbolic violence as central, Luhmann would retain any presumption of the centrality of domination. Instead, Luhmann would view the selective connectivity of communications with a focus on certain societal functions as bases for the horizontal differentiation of large social systems. Furthermore, the focus would be on performances of such systems to one another in the form of their structural coupling within vertical differentiation of organizations and in solving situational complexities of daily conduct in interactions.

Our first case example will concern of the formation of the discipline of educational sciences in the context of the Finnish welfare state, elaborating on previous publications by Kantasalmi (2010, 2014, 2015). Our second example comes from the transformation of plant production research in the era when the emphasis of policy shifted from science and technology toward innovation. It elaborates on the previous publications by Tuunainen (2005a, 2005b; Tuunainen & Knuuttila, 2008, 2009). In both of the illustrative cases, the system of higher education offers the organizational settings in focus, and in both cases the conceptualization of the more extended context, the organizational field, appears to be potentially fertile for explaining the characteristics of the disciplinary struggles that culminate in the university organization. Along with Bourdieu, we will argue that it would be mistaken to assume “scientific power” as relevant for the permeability or plasticity of disciplinary boundaries alone. The question is rather how we should theoretically regulate the analysis of factors external to science and the overlaps between education (faculty/ies) and science (discipline/s), in particular.

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Two cases of disciplinary struggle in Finland problematizing the organizational field

According to Bourdieu (1988a), the wider social space with its objective structures conditions the changing societal valuations of faculties via struggles in the academic field. Disciplines are viewed as being incorporated within faculties in the academic field, but are simultaneously considered subfields in the larger field of science, which also has other relevant spaces external to a particular university or field of education. In Bourdieusian differentiation theory, however, it is not clear how we should distinguish between overlapping fields in the process of discipline-making (Müller, 1992; Kneer, 2004). As the analytical construction of the field suggests its perpetual rethinking (Bourdieu & Wacquant, 1992, p. 110), no synthesizing systems logic is presumed for the scrutiny of boundary processes. The hybridity in discipline-making can be uncovered mainly by elaborating the struggles where actors deploy field-specific assets and are involved in differing capital conversions in academic and scientific fields demarcated according to the scope of their impact, i.e., definable powers in each analytical case. Likewise, examples offered by the neoinstitutionalists about how to construct organizational fields that are institutionally significant to the university depend on the empirical site under study; the ambiguity of rules for constructing such fields appears to suggest endless areas (Friedland, 2009) with somewhat unclear reference points for marking social boundaries relevant for discipline making.

The Bourdieusian view suggests focusing on symbolic power and domination in boundary processes (Pachucki, Pendergrass & Lamont, 2007). The Luhmannian differentiation view, in turn, assumes significant societal boundaries for scientific disciplines in functional terms. This does not mean that inter- or transdisciplinary performances would not be possible; on the contrary, they are plausible when external expectations for applications of science intensify. The university system tends to keep its significant self-referentially defined boundaries clear by observing and communicating organizational decisions related to the system's reference problems, such as how to maintain the optimal structural coupling between science and education organizationally when facing a variety of societal challenges. The variation of educational programs and research project designs allows flexibility while holding on to the disciplinary core of science, which concerns the right reductions of researchable problems. Thus, we cannot simply assume that intensified structural expectations for economization would directly permeate the societal system of science or education (Peetz, 2015) in what seems to be a hybrid organizational arrangement within the university. In other words, what on the phenomenal surface appears as hybridity requires precision in describing the effective translations between the distinct communication formats.

Thus, our first case example offers illustrations of the instances where the university-centered systems of tertiary schooling in Finland expanded in tandem with the wider "organizational field", thereby producing boundary dynamics that transformed the disciplinary structure of the Finnish university during the 1970s. The illustration of the related boundary process draws upon the analysis of the development of education science, including its sub-discipline of adult education. Education sciences, with historically problematic disciplinary autonomy

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(Hoskin, 1993), co-evolved with the rest of the school system, and with its increasing number of teachers and emerging teacher professionalism, which included academic field-related Bourdieusian-style status rivalry between university-educated upper-secondary-schoolteachers and folk-schoolteachers trained in teacher seminars (Kantasalmi, 2010, 2014). On the other hand, excessive protection of autonomy, say, even in the “hardest of sciences” with a closed universe of “formal games”, might come at the cost of “self-exclusions”, leading to overcautiousness, inhibiting the essentials from escaping “from the closed circle of the initiated” (Bourdieu, 1991a, p. 19–20, 1991b, p. 128–129, 131). However, there were perhaps more significant structural expectations in the societal environment conditioning the disciplinary decisions of the educational sciences. We thus aim to illustrate that the Bourdieusian power struggle-driven view on constructing “organizational fields” does not offer an entirely convincing explanation of the process that, instead of reproducing the disciplinary order, transformed it.

We suggest that a better explanation of the transformative communication in disciplinary decisions within the university system benefits from the elaboration of institutionalized, assumed bases of such communications: the Bourdieusian world of *doxa*. This means observing the special semantics produced in reflexive boundary processes related to the problem-driven tensions between *orthodoxy* and *heterodoxy*, and the related experiences between *paradoxy* and *alloodoxy* in the “silence of doxa”. Thus, it is possible to locate the potentially transformative breaks that point to two conceptually important directions, first, to the differentiation-theoretically informed clarification of the contextually relevant boundary topic and, second, to the specification of the role of reflexivity in the boundary process. That is, to elaborate the neoinstitutionalist notion of organizational field with the help of the Bourdieusian perspective and switch to Luhmannian lenses that offer a more precise capacity for gradation.

Case 1: Organizational field at the national level in educational sciences

The historical development of our first case suggests the construction of two relevant organizational fields that highlight the conditioning effects on the boundary issues in discipline making within the university-centered systems of tertiary schooling in education. Such fields included various interrelated organizations and NGOs as well as social movements, which together channeled external social forces with transformative capacity to restructure the university discipline structure. Two specific processes drew together several forces in the field: 1) the development of the Pedagogical College in Jyväskylä (Kasvatusopillinen korkeakoulu), established in 1934, which, in the 1960s, formed a nucleus for the University of Jyväskylä, and 2) the transformation of the College for Sciences of the Society (Yhteiskunnallinen korkeakoulu), established in Helsinki in 1925, into the University of Tampere in 1966.

In addition to the strategic agency motivated by folk school teachers’ professionalism (Kantasalmi 2010), the Pedagogical College was an organizational answer to the *allodoxic* experiences of this teacher group, which had been increasing in number but whose career perspectives were limited due to a lack of university education. The changes in the level of edu-

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cation of the entire schoolteacher population brought forth a struggle for social positions between the expanding group of seminar-trained folk school teachers and those of university-educated upper secondary school teachers. The Pedagogical College clearly contributed to the academic level of the education for the entire teacher body. It gradually increased expectations for bringing the education of both of these teacher groups to the university, which happened through incorporation of the teacher training seminars into Finnish universities in the 1970s.

This organizational reform was related to a school reform that was strongly framed by the development of the Nordic welfare state. It started in Sweden in 1962 and continued in Norway in 1969, Finland in 1970 and Denmark in 1975, resulting in the development of a nine-year comprehensive school system. It abolished the folk school system and contributed to breaking down the old organizational arrangement in teacher education, one divided into seminars and universities. In Finland, the Pedagogical College of Jyväskylä had emerged in this divided context as a higher education organization that fostered the professional aspirations of those trained in the seminars, and thus accumulated relevant field forces. As a result of the split of the nation due to the Civil War (1918), the growing importance of public schooling during the first decades of Finland's independence (1917–39) facilitated important services for the production of symbolic orders in the nation state, thus offering a strategic alliance for fostering teacher professionalism. During discipline making, this made it possible for education science to avoid direct confrontation with competing disciplines, psychology in particular, within the university, as well as to draw symbolic power from the alliance in the organizational field, and to bring it into the realm of scientific debate on the status of education as a discipline. Interpreted with the help of the concept of “organizational field”, such boundary work in discipline making comes close to what Bourdieu (1991a, p. 19) meant by the two-fold division of social sciences, “the field of generalized production” as distinguished from the “field of restricted production that is to itself its own market”. The former “field” offers ideological services to the dominant power. In educational science, this distinction is less clear due to the discipline's close association with the reflection of the school system, or in structural coupling with teacher training, to deliver societally significant performances.

Driven by the comprehensive school reform, the establishment of the faculties of education in Finnish universities thus meant an organizational metamorphosis that abolished the seminars for folk school teachers and transferred the locus of the disciplinary development from the “organizational field” into the university (Kantasalmi, 2010). Thereafter, the system of science increased expectations on educational sciences, which needed to compete, above all, with psychology, a discipline connecting easier than social sciences to educative communication. The structural coupling with the school system and teacher professionalism, however, continued to shape the disciplinary development. The focus on sub-disciplinary development, namely adult education, illustrates the latter point. It also explains the need to construct yet another organizational field in order to explain the controversies encountered during boundary work and the related needs to elaborate on the processing of meaning in the breaking of the silence of doxa.

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A central organization for the sub-disciplinary development of adult education was the College for Sciences of the Society, a pathbreaker for the social sciences. The organizational field relevant to adult education consisted of more dispersed disciplinary concerns than mere pedagogy or emerging educational sciences. The college, whose teaching staff bore connections to the university system, offered education in social policy, sociology, social history and journalism as well as training of municipal civil servants and librarians. Additionally, training was offered for educational tasks with loci in different practices of the organizational field, such as municipal workers' institutes and civic educational organizations, but also in politically affiliated workers' educational associations. This dispersed educational practice in the process of discipline making drew upon the evolving theoretical basis of German *Volksbildungslehre*, which corresponds to the Finnish concept of *kansansivistysoppi* for the then-subject domain of the college. Further disciplinary inspiration came from the British and American traditions of liberal adult education as well as from Scandinavian experiences of so-called folk high schools and study circles.

Based on the diversity of practices in the "organizational field", competing disciplinary valuations to those of the pedagogy and educational sciences were still present. Thus, the first attempts at discipline making in adult education between the 1920s and 40s within the college and related association (Kansansivistysopillinen yhdistys) showed inter- or even transdisciplinary aims. The first Professor in adult education, Urpo Harva, was himself a doctor in philosophy, not in education (Kantasalmi, 2014). The multidisciplinary influences, however, were relinquished in the 1960s as the college moved towards university status. This happened in the context the comprehensive school reform, which oriented adult education along the lines of intensifying teacher professionalism and the development of educational sciences. As concerns the disciplinary reflection, the 1950s and 60s appeared as turning point, a period when the College was moved from Helsinki to Tampere to provide the city with a seed for a university. Should we follow the Bourdieusian line of interpreting the strategic alliance as the source for boundary work, the successful professionalization of diverse adult education practices seems less likely than that of schoolteachers. The paradox of training adult educators was in the societally less-recognized credentials, which could not offer exclusive qualifications comparable to those of the municipal schoolteachers. This became clear to the Professor Harva during the transfer of the college to Tampere: the new university carried the legacy of the College for Sciences of the Society, and thus the debate over the interdisciplinary orientation in adult education continued in the newly formed faculty structure.

In both of these instances of discipline making, one can gain an understanding of the process by means of switching the focus from the Bourdieusian strategic action and investments in the forms of capital to the selective connectivity of communications around the doxic experiences related to tensions with the mainstream disciplinary orders. The process of discipline formation took place in tandem with the emerging new university faculty structure, but the relevant organizational field for adult education was not as clear as for schoolteacher professionalism related to the comprehensive school reform. The university membership of comprehensive school teachers' training could be attached to the traditional university-trained upper

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secondary school teachers' pedagogical formation, but the more dispersed field of practice of adult educators could at least in theory seek disciplinary connection in the social sciences or even history. In the instances where the forces of the organizational field of adult education permeated the university, the analysis of varying experiences with the disciplinary doxa might prove more fruitful than the presumed preponderance of strategic domination supported by the school system. In our view, this would produce a more precise description of the communication dynamics in complex mergers of the university's internal orders, such as the double determination of disciplines in scientific and educational practices, where the former is oriented towards production of new scientific knowledge and the latter towards dissemination of existing knowledge and reproduction of scientists.

Thus, in the case of the College for Sciences of the Society, there were versatile disciplinary points of permeation in the organizational boundary of the university. The delimiting decisions made in relation to the interdisciplinarity of adult education was partly a result of unsuccessful disturbing of disciplinary doxa related to teacher professionalism supported by the school system. The conscious heterodoxy, which took place in the boundary process, remained scattered and could not enforce effects on the mainstream orthodoxy. This could be interpreted as resulting from the erroneous credence in the objective acknowledgement of the relevance of trans- or interdisciplinarity in the societal uses of the training of adult educators; its practices were far less structured than those of the school system. Luhmann (1990, p. 447) believes that disciplines often become institutionalized in close relation to the reflection theories of a certain societal function system, such as jurisprudence in the law or theories of teaching in schooling. Adult education, with its roots in the movement for social change, could have had other disciplinary nexuses than didactics, toward which it was geared during the 1950s–80s. In science, however, the daily societal practices do not formulate problems according to disciplinary divisions, leading to the occurrence of inter- and transdisciplinary performances (Luhmann, 1990, p. 642; see also, Panofsky, 2011). The semantics of discipline making in terms of *Volksbildungslehre/kansansivistysoppi* in the early years of the College for Sciences of the Society may have indeed sprouted *allodoxia*, meaning that its protagonists created wishful but erroneous views of the future disciplinary development. The Bourdieusian tools nevertheless lead us to suggest Luhmannian-inspired scrutiny of the semantic analysis, i.e., to ask: How did such disciplinary semantics lose its structural relevance and leave the meanings of the disciplinary boundaries cognitively open to processing in the school system-driven terms?

Case 2: Isomorphic pressures and restoration of doxa in a university department

Our second case exemplifies a situation where strong isomorphic pressures emanating from the global organizational field of biotechnology evoked multiple reflective processes concerning the potential transformation of the existing departmental research tradition and possibilities of university scientists to become engaged in business activities at the University of Helsinki in the 1990s. Concerning these issues, multiple interpretations were made in the lo-

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cal organizational context to seal external influences off from the university department's academic core, which was formed based on a single, nationally oriented discipline of crop sciences. Characteristic of crop science was the aim to increase the productivity of crop plants by studying and developing plant-specific cultivation techniques and cropping systems for use in the Finnish agriculture. However, resulting from the changes in the external institutional environment, namely, the emergence of a hybrid organizational field related to biotechnology, isomorphic pressures in the form of new research methods and commercialized science began to shape the orthodox departmental tradition. The forces that shook the state of doxa in the department had possible homogenizing effects in terms of creating alignments between the department's research and the global biotechnology industry, but at the same time, they evoked *allodoxia* as the actors involved tried to make sense of the disturbing situations they encountered. By permeating the organizational boundary of the university, these forces gave birth to a strong articulation of presupposed assumptions of public academic research and teaching as well as the department's engagement with the conventional research tradition. This confrontation between the isomorphic tendencies sprouting from the global organizational field and efforts to maintain traditional ways of action is illustrated below with reference to two instances: first, an attempt to modernize the department's research orientation (Tuunainen, 2005b) and, second, commercial engagement of its research (Tuunainen, 2005a; Tuunainen & Knuuttila, 2008, 2009).

Concerning the first instance, the new kind of reputational forces related to biotechnological research and the associated organizational field challenged the existing practices of plant production researchers. A central tension was the conflict between traditional crop science and horticulture, and the new orientations of biotechnology and agroecology. Methodologically, crop science and horticulture used external manipulation of plants as well as quantitative analysis of observations achieved through field and greenhouse experiments. Biotechnology, in turn, sought to open up the black box of the plant at cellular, molecular and genetic levels to manipulate its genes and to develop more advanced plant varieties for agricultural use. In Finland, this reorientation in plant production was tied to governmental efforts seeking to upgrade the technological basis of science amid growing international competition. In the present case, this external pressure entered the department in the form of a young and ambitious female scholar who was returning to Finland after a period of working abroad. After receiving professorship, she initiated an effort to "modernize" the department. Based on her international experience, she viewed this to be necessary, emanating from the global development of life sciences, and thus strongly advocated the need for upgrading the level of the "old-fashioned" department and the whole of the Finnish agricultural research tradition.

This effort to transform plant production research shook the doxa, i.e., the presupposed assumptions of the local scientific culture, and gave birth to strong attempts to protect the department from the external influence, which increased disciplinary heterodoxy. The ensuing reflective contestation took the shape of establishing strong boundaries between different disciplines present in the department. To begin with, multiple distinctions in terms of research

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methods were drawn. There were biotechnologists who, despite their education in crop science, took bold and sometimes paradoxical positions as the ones who represented the new scientific approaches against the old and traditional ones. During the most critical phases of the debate, allodoxic experiences emerged as actors made one-sided identifications and characterizations of each other and each other's disciplines. Crop science, for instance, was regarded as "completely outdated" in relation to biotechnology, which was self-characterized as "modern" because of its capacity to analyze and transform internal biological processes of plants, while crop science and horticulture were bound to externally manipulating their growing conditions, and to quantitatively analyzing observations thus achieved.

Another reflective disciplinary contestation considered relations between biotechnology, agroecology and crop science. Emphasizing the ecological dimension of agricultural practice, agroecology found its relationship with crop science strained, since crop science was associated with conventional farming methods and thus, in the words of an agroecologist, "compromised" ecological sustainability by accepting the unsustainable use of fertilizers and insecticides in farming systems. Agroecology, in turn, drew its inspiration from ecology and investigated farming systems in terms of relationships between crop plants and their biological environments, instead of emphasizing agricultural productivity. Because agroecology was associated with those political movements that underlined the need for advancing environmental protection and sustainable farming, some representatives of other disciplines regarded it as "a politicized science". Thus, similarly to biotechnology, agroecologists wanted to advance a basic biological perspective, were critical of the existing research orientation and claimed that paradigmatic change along the lines of sustainability was needed.

Encountering pressures to become aligned with research drawing from either biotechnology or ecology, crop scientists and horticulturalists stuck to their disciplinary identities, claiming that they did not want "to become biotechnologists" and that their work had a legitimate scientific basis of its own, i.e., a goal other disciplines did not care about. Based on this, they strongly resisted the competitiveness-oriented biotechnologists as well as the agroecologists' claims of outdatedness in terms of their research. This case thus illustrates that as the external pressures sprouting from broader organizational field penetrated the university, new reflective demarcations between the disciplines emerged in order to resist the infringement of the existing scientific understandings within the department.

The second confrontation between the homogenizing forces of the organizational field concerns the commercial engagement of university research in a situation where biotechnology began leaning towards entrepreneurship while university remained a public-sector organization. As claimed by neoinstitutionalists (Owen-Smith, 2003, 2006; Owen-Smith & Powell, 2001), academics often respond to reputational pressures coming from both industry and academia, leading them to search for activities where they can maintain their university positions and become engaged in businesses. Such was the situation in the department studied here. Instead of contenting themselves with industrial collaboration only, the Professor's research group sought to occupy academic and corporate positions concurrently, thereby forming what

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can be called a hybrid entity of a research group and firm. In the case of such hybrids, the dividing line between the university and industry vanishes. Because no clear-cut rules and regulations existed for managing such entities at the university, the conditions for business activity became an issue of considerable reflective contention, which sought to maintain the university's orthodox orientation as a sphere of public science. The following issues led to controversy: 1) the bureaucratic accountability and teaching performance of the Professor, 2) the loan of the university's research materials and instruments to the firm and 3) the ownership of the intellectual property rights (IPRs) of research results.

As in the first instance of the isomorphic pressures, the dilemma was solved via the establishment of boundaries: the university administrators wanted to make sure that a fine line remained between the hybrid community's academic work and its commercial projects. To create it, they wanted to ensure that the Professor performed her teaching duties diligently. Administrative reports and plans concerning the allocation of her working time were thus called for; indeed, the administrators identified her as a person who was "neglecting her duties". The Professor had a different self-understanding. She was perplexed and irritated by these requests, believing that they questioned her academic freedom and were detrimental to the department's applied mission, which would be achieved via commercialization. Moreover, she regarded the company as "a private matter", with no ties to the university other than the rental of laboratory space.

In addition to the Professor's teaching performance, confusion emerged over the ownership of the research materials and instruments. When transferring to its new laboratory in the university's business incubator, the Professor's group took with it research materials and instruments acquired through public grants. The issue was whether the group had a right to do so, and thus a serious conflict ensued. Not wanting to raise any further complications, the company's CEO arranged a quick resolution to the dispute: some items were returned while others were lent by means of a loan contract, a temporary way to structurally couple the distinct areas of science and economy.

With respect to the IPRs, the controversy included two issues. First, it was not clear who had the juridical right – the university or the researchers-inventors – to patent the results of a project concerning biotechnological oat improvement. The debate was associated with the proposed alteration of the governmental IPR policy, according to which the commercial utilization of scientific research required assurance by transferring the IPRs from academics to the university, as was the case in reference countries. In this instance, the Professor insisted that the inventors still had the right to patent the results, while the university lawyers expected the group to comply with the dominant pattern present in the broader organizational field. The second problem was related to the group's effort to have as large a patent portfolio for its company as possible, i.e., all patents by the Professor's group. However, the group had given its early patents to the university's licensing company, which was unwilling to restore these to the researchers. In both of these cases, negotiations were deadlocked for long periods of time as the local actors became engaged in considerable reflective sense-making over the

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proper organizational solutions – i.e. Luhmannian structural couplings between science and economy – in a situation where external pressures led to changes in the conventional behavioral patterns in the university.

Owing to the reflective processes described above, the Professor's group left the department and became associated with the university's biotechnology research institute operating in a local science park. In connection with this association, the group and the institute drafted a collaborative agreement, which provided the actors with a temporary coupling between science and economy: The fuzzy university-industry boundary was resolved by abandoning the hybrid roles of researcher-entrepreneurs and defining separate locations for academic research and commercial development. Furthermore, the finances of the group were subjected to close scrutiny by the institute's administration. Although not entirely disconnecting the group's academic projects from the company, these measures provided an organizational resolution of the acute problem of hybridizing science with business: the economic activity was sealed away from the university's scientific core in a peripheral organizational position of the business incubator.

To summarize, because of the wider developments in the organizational field of biotechnology, a series of conflicts emerged in the university department. These included: 1) the confrontation of the orthodox agricultural research traditions with emergent ones emanating from biological sciences and 2) the reflection over the organizational conditions and solutions defining the leeway for the commercial engagement of the group. Hence, instead of smoothly becoming adapted to the homogenizing forces that penetrated the organization, the university sought to protect its conventional locus for doing public science and resisted the direct economic influence by means of cultural and administrative boundary work. By so doing, it worked towards restoring the existing disciplinary and organizational doxa, i.e., the presupposed assumptions about the appropriate modes of academic activity. Thus, the isomorphic tendencies external to the university did not correspond to equally dramatic changes at the level of local organizational practices. While universities certainly adapt to the changing conditions, they simultaneously work towards protecting their academic core from direct external influences. Giving clear conceptual form to the ways that these reflective practices and related structural couplings came forth does not seem to be conceivable through neoinstitutionalist or Bourdieusian conceptualities alone, but also requires a Luhmannian perspective.

Organizational field or organization as system unfolding the complexity of its environment in discipline making?

As a conclusion, we will make a few remarks based on the discussion above. First, our illustrations raise empirical concern over the concept of organizational field as an analytical construct. As discussed by Powell and others (2005, p. 1134), organizational field can be regarded not only as a set of relations among various actors, but also as a center of debates in which participants contest and negotiate the interpretation of some key issues. Accordingly, fields emerge "when social, technological, or economic changes exert pressure on existing

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relations and reconfigure models of action and social structures” (Powell et al., 2005, p. 1134). Thus, the concept is strong in emphasizing the ways in which actors form shared arenas for social practices, but it does not give much advice for focusing empirical analysis on the emerging boundary processes.

Nor does the metaphor help much in the conceptualization of the relationships between differentiated fields in the environment of the university, such as science, education and politics. The demarcation of what is internal and external to the organization remains vague and does not offer clear tools for empirically addressing the permeation of external forces nor the hybridity of boundary processes. Thus, rather than advising on how to structure the organizational field, DiMaggio and Powell (1983, p. 148) leave the issue open: “The structure of an organizational field cannot be determined a priori but must be defined on the basis of empirical investigation”. In this sense, the concept is really like the Bourdieusian analytical construction, whereas the Luhmannian system is also a synthetic device.

Second, the concept of organizational field is appropriate as a guiding metaphor for constructing analytical fields for the organization-specific issues of functionalization and historicization of the instances of permeability. In accordance with the Bourdieusian conceptuality, this means that the field needs perpetual rethinking (Bourdieu & Wacquant, 1992, p. 110). As illustrated in our first case, the organizational field would be strong in the analysis of pointing to intermediate space between society and organization (meso-level) rather than in micro-level analyses of debates within organizations. In our second case, we showed that the basic elements (theories, themes, categories, concepts etc.) of doing science can be constructed as connected to the wider environment of the organizational field to explain situational outcomes of disciplinary controversies within the university. Thus, a rigidity of analytical levels (micro-meso-macro) does not necessarily follow the intention of the neoinstitutionalist metaphor. It would definitively disregard the aspirations of grasping the structuration of emergent processes by surpassing the level rigidity in Bourdieusian and Luhmannian conceptualities.

Third, we suggest controlled switches between Bourdieusian and Luhmannian conceptualities as perspectives for sharpening the descriptions of complex boundary processes implied in the metaphor of organizational field. Above, we have suggested some instances for such a pursuit. We, however, give the final word to the Luhmannian conceptuality, already implied in our viewing of universities as organizations that structurally couple science and education. We believe that a better understanding of the differentiation of disciplines, sub-disciplines as well as interdisciplinary research orientations requires sufficiently general conceptual means to control the observation of such boundaries. In our view, when analyzing the observing agents or systems involved in such boundary problems, general theory is regarded as a prerequisite for controlled uses of distinctions, such as inside / outside, inclusion / exclusion, organization / field, system / environment, function / performance. Structural coupling, in the Luhmannian conceptuality, substitutes older systems theoretical idea of input-output mechanisms and implies fundamental difference in observing all types of social systems as being capable of repeating the basal difference between the system and its environment.

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In the domain of global science, whether understood as differentiated institutional sphere, Bourdieusian field or Luhmannian communication system, we need ways to keep track of its societal relations, e.g., curricular programs coupled to their societal environment through diplomas, and research programs structurally coupled to economy through temporary research contracts. Both education and science are connected to the problem of how to stabilize disciplinary boundaries when facing different societal logics of practices, or formats of communication, within the university organization. Disciplines are the main structural units of organizing this two-way communication guiding the internal differentiation of science and its visibility to outside observers (Stichweh, 1994, 2001). Universities as organizations, in turn, process the communication of decisions and prepare new decisions. Concerning internal decisions of the coupling of the two societal systems (science and education), the university views its external environment through schemes that maintain relevance to science and education, and their wider societal uses. Where the differentiation of fields appears too fuzzy, a complementary distinction between the system and environment is recommendable. By pointing to separation between the function each societal system in the society as well as the performance each system delivers for other systems, we would have rather solid basis for developing tools for addressing the boundary problems pointed out by the neoinstitutionalist notion of organizational field.

Crossing organizational boundaries is certainly not only a Bourdieusian issue of how to dominate others by imposing effective forms of capital to exercise symbolic coercion for subjugation or subversion. Instead, the Luhmannian bracketing of the human irritations to the social system, and his view of these as operationally closed communicating systems with humans in their environment enables us to specify systemic unlikeliness, the eventual impossibility of certain actions (Baecker, 2016, p. 26). Bluntly stated, the radical contingency in the current, complex society of communication requires consistent conceptuality for in order to gain precision when describing the forms of structural couplings of technoscience. Transdisciplinary problems in the societal environment of the university, whether arising from the dissemination of knowledge in education or from the innovation-inspired growth of economy, call for descriptive precision. Luhmannian conceptuality would allow such consistency in relating the focus of reflection theories of the function systems and the processual reflexivity producing special reference problem-related semantics. The latter might even involve rhetorical semantics as in Gieryn's (1999) boundary work.

In our cases, we have discussed the analytical potential of the neoinstitutionalist metaphor of organizational field in relation to the Bourdieusian and Luhmannian theoretical frameworks. We have pointed out their possible theoretical complementarities in dealing with the issues of boundaries in discipline making within the polyphony of the current university. From the Luhmannian communication-based viewpoint, we feel that the strength of the Bourdieusian perspective lies in its operationalization of the cultural aspects of power, especially in terms of field specific analyses of troublesome *doxic experiences*. However, analysis of disciplinary struggles suggests considering epistemic gains and losses in conceptualizing the system of higher education and universities as fields. We see potential losses in viewing the university

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as an overly permeable field. In this, we come close to Archer's (1983) critique of the Bourdieusian "system", i.e., the field as a "system of relations independent of the populations which these relations define" (Bourdieu & Wacquant 1992, p. 106). However, we believe that based on the conceptuality of Luhmannian systems theory, it would be possible to offer a clearer specification of the horizontal differentiation between schooling and science, and their interdependent organizational relations in discipline making within universities.

Bourdieu's (1988a) view of the struggle of disciplines as internal to university faculties allows for the conflation of the two, and thus, the issue of relative autonomy of science and tertiary schooling becomes difficult to follow as processes. Thus, contrary to Lenoir's (1997, p. 58) Bourdieusian claim, according to which "disciplines are political institutions that demarcate areas of academic territory", systems theory would insist on more precision concerning what is meant by "academic territory" and would conceive the political institutions as environments of science, meaning that science communicates according to its proper understanding of relevance of policy programs. When it comes to universities as organizations that communicate disciplinary decisions on the basis conditioned by such programs, we would follow the Luhmannian suggestion of differentiating the "contingency formulas" in the political environment of science from "contingency schemes" internal to science (see, Kantasalmi 2015). As we have pointed out, there is a need to develop a more nuanced notion of reflection and reflexivity as system-internal performances with particular relevance for grasping the couplings between different forms of power (e.g., scientific authority, political and economic aspect and educational persuasions) in the complexity of boundary processes related to disciplinary differentiations and stabilizations.

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