Governance of universities and scientific innovation

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ABSTRACT

In this article the tension between the tendency of scientific disciplines to "diversify" on the one hand and capacities of universities to give new scientific fields an institutional "home" is tackled. The assumption is that new scientific fields must find support among scientists and cognitive units of universities in order to be included. As science is a strongly competitive social field, inclusion often meets resistance. It is argued in this article that opportunities of new scientific fields to be included depend on the kind of governance regimes ruling universities. A comparison of the former bureaucratic-oligarchic governance model in most European universities with the existing New Public Management governance model demonstrates that the propensity of universities to include new scientific fields is increased though there may be a price to pay in terms of which fields stand a chance to be integrated and in terms of institutional possibilities for the invention of new ideas.

I. Introduction

A new scientific idea is born, a new method invented, a new technology discovered, a new empirical field is scrutinised and filled with theoretical expectations: all this is scientific innovation. The initial question in this article is: what happens to these kinds of *scientific* innovations once they appear on the radar of science?

Each new scientific idea is worthless as long as it does not find followers. Science is not different from religious communities or political parties in this respect. A new answer to a long asked question is an isolated event if one cannot convince other scientists of the value of this answer. In other words, scientific innovation is not only the discovery but also the diffusion of ideas among the scientific community. Only if a group of scientists - preferably many groups - adhere to the original idea and accept it as being novel and express its willingness to follow the lines of the new idea, a new finding becomes visible and will be carried on by researchers trying to corroborate or refute the new idea. However, new ideas may also be ignored, they may fail to find support, not only by

scientists, but also by scientific institutions as, for example scientific editors, scientific associations, funding agencies or universities. New ideas will disappear, if they cannot be institutionalised in one way or other.

Institutionalisation is the best way to stabilise new ideas, to give them continuity, to make them part of the daily scientific struggle for reputation. The institutionalisation of scientific innovation is, however, not something that just happens or takes place. It needs not only convincing arguments to find followers but above all resources and resources are scarce. If one accepts a "competition view" of scientific development, one cannot expect that new ideas that need resources and, often, contest existing ideas, will be accepted with open arms by the scientific community. This tension between scientific advancement on the one hand and possible social and economic conflicts during the process of institutionalisation on the other is the topic of this article.

Though there are various steps to be taken in the process of diffusion in order to arrive at a fully developed scientific field – the decision of individual scientists to engage and invest into a new field of science; the creation of research communities in order to get hold in the academic community; the acquisition of continuous research funds – this article will focus on the last step of institutional anchorage of new ideas, i.e. the implantation of new ideas into universities.

Universities can be regarded as the main place for disciplinary reproduction. They confer academic titles necessary for the pursuit of a scientific career; they deliver the infrastructure for disciplinary reproduction (like for the organisation of conferences; the education of students and doctoral fellows that can form the future recruits for the scientific field; office space, laboratories); they put certain resources at the disposition of scientists that are needed for their academic careers (some research money; logistical help for funding applications etc.); and most important of all, they give jobs to scientists that form the point of departure for academic creativity. This is why each new scientific field must, once a certain critical mass and intensity of communication is reached, settle down in universities. Only then, a continuing financing (above all in the form of salaries) of the new field becomes possible. Last but not least, universities have authority to set up the main institutional embodiment of disciplines, i.e. departments as well as faculties. This is the strongest sign of recognition for a new scientific field. On the scale of specialties and subspecialties, they can also install other forms of institutionalisation, for

example “schools” (for public health) or research centres and at the level of the “research community” they can support research groups.

New scientific fields can probably grow for a certain time outside universities, for example in research networks or in extra-university research institutes, but for consolidation it needs the recognition by universities expressed in the employment of scientists as professors in universities. The title of a professor does not only guarantee the disposition over resources for a foreseeable future but is also a symbolic flag for the recognition of a scientific field by the academic community. This is possible because universities are – even today – still considered to be the representation of the academic community itself. The conferral of a professorial title in a university is equivalent to the “accolade” by the academic community.

Looking into the institutional conditions of scientific innovation is not a new topic in the sociology of science. There was an intense discussion in the 1960s and the 1970s on *scientific growth* [1-4] – which treated various aspects of the diffusion of scientific fields. Most prominent has been without a doubt the work by Ben-David [5], [6] who looked, from a historical perspective, in particular into the relationship of higher education systems and conditions of scientific growth. Since then, interest in sociology of science has mostly been diverted by other questions. There have been, however, a number of substantial contributions by authors who dealt with scientific growth in terms of the development of academic disciplines in general. This literature was often closely linked to higher education studies [7-15].

There are two reasons that seem to make it worthwhile to take up these questions again today:

One is the obvious acceleration in the growth of knowledge (see only the growth in publications) and the concomitant tendency for differentiation of knowledge fields, i.e. the increasing number of research communities, subspecialties, specialities and disciplines [16]. Bonaccorsi has recently pointed to both aspects in his observation of the “new and young sciences” (information sciences, material sciences, life sciences) with high growth rates of production and an obvious tendency to “diversify”, i.e. to create more and more subdivisions of existing knowledge fields [17], [18]. On the other hand, these new and proliferating tendencies to diversify demand institutional opportunities that for example universities built on the “Humboldtian model” may not

any longer be able to deliver [19: 309]. Existing scientific institutions, especially universities, may fail to furnish a "locus", a "home", for these new scientific fields and thereby hamper "scientific innovation".

University governance regimes play an essential role in the link between university institutions and spread of scientific fields. Above all because governance determines competences and authority within universities and hence the dynamics of cognitive structuring in universities. The existence of the hierarchical "chair system" in the Humboldt university, Bonaccorsi explains (2008), may be an advantage if a scientific field converges but a disadvantage when it diverges. He does not explain the mechanisms but it is clear that hierarchy situated in chairs makes differentiation into various disciplines difficult while other types of internal governance may have a productive influence. As during the last 20 years most universities have experienced a reform of their constitutions and, hence, of their governance regimes (mostly the instauration of new public management regimes), it becomes interesting to see whether the introduction of such regimes contributes to a growing ability of science to spread scientific innovation by the institutionalisation of new scientific fields.

The tension between universities as host institutions of scientific fields and the dynamics of scientific expansion are the topic of this article. Governance structures of universities influence this relationship and different governance structures do this in different ways. In this article, the new public management governance structure will be the focus of investigation and the research question is: *To what extent is scientific innovation fostered or constrained by the introduction of the new public management model in comparison to the older bureaucratic-oligarchic model*?

We will proceed in the following way: First, the concept of scientific innovation will be elaborated in more detail. Second, it will be attempted to demonstrate the "logic of integration" existing in the older bureaucratic-oligarchic model. Third, the new public management model and its effects on the governing of scientific diffusion in universities will be discussed.

II. Conceptualising Scientific Innovation

In order to spread, a new scientific idea must gain hold in the scientific community and this means most of the time within the confines of a general discipline. Diffusion of scientific ideas is a continuing process of institutionalising the original idea on an increasing scale of recognition within the academic community.

A. Steps of Institutionalisation in the Diffusion of Scientific Ideas

One can imagine that the first level of institutional recognition is the status of a *research community* united by a common interest into a research theme, the use of a common method or technology or by the application of a certain theoretical approach. Such a community may start in the form of smaller research groups and expand later on to form clusters and networks [20]. Institutionalisation at this stage means the acquisition of continuing funding resources, the conquering of time slots in conferences of the mother discipline, the creation of a scientific journal, the setup of a working group in the disciplinary association etc.

The next step would be – but there is until now no consensus on the way to subdivide the different institutional levels of scientific knowledge domains – the ascent to a *subspecialty* which can consist in the foundation of a scientific association (though this is not necessary), the organisation of own conferences and – above all – the development of a first teaching canon indicating that a certain unity in the use of theories and methods has been reached. This is also the time that universities might offer employment to scientists in the form of professorships, mostly announced in the form of a disciplinary-bound professorship with particular emphasis on the subspecialty area. In the discipline of political science and in the specialty of comparative political science, “area studies” would for example be such a subspecialty.

The next higher step of institutionalising is the creation of a *specialty* or better, the institutional recognition of a specialty. The new field is now considered as being an essential and acknowledged subarea of the mother discipline. Within disciplinary departments, specialties are the main components and they are embodied in professorships acknowledged in almost all universities. The teaching canon is now clearly standardised and a substantial number of students are following courses. A specialty has own associations, holds own conferences and various journals, and starts

to be differentiated again into different subdomains or subspecialties. The status of a specialty guarantees already long-term survival of the area.

Finally, *disciplines*, are such a wide subject area that a differentiation into specialties is a necessity to present the discipline to the wider audience. A professorship of "political science" might occasionally exist today but certainly not without a more detailed emphasis on the specialty that should be represented. For example, in political science this might be "comparative political science" or "international relations" though the latter has in the meantime almost reached the status of an own discipline, visible in the creation of own departments. Departments are, as Evans [21: 253-4] states, the "most concrete and permanent enactment" of a discipline. "This is where a discipline becomes an institutional subject".

Cognitive differentiation, which happens all the time in the scientific enterprise, is therefore a process that needs time, an increasing number of followers and institutionalisation strategies of different orders.

From a "*competition view of science*"[1], institutionalisation does not just take place. It does not just happen because it is functional for the development of science. There are a lot of investments to be made and a lot of obstacles to overcome. In order to estimate the kind of obstacles that might exist, we start from Bourdieu's vision of a scientific community (the "champs scientifique") which, on different levels ("sciences" like natural, life, and social sciences; disciplines; specialties; and so forth) generates constant competition for recognition ("symbolic capital") and resources ("economic capital"). A

[1] A „competition view of science" is not considered to be a clearly distinct approach of its own in the sociology of science. Rather one can state that various authors that would not consider them as belonging to one school refer to similar dynamics of scientific production and reproduction though the use of concepts and their interpretation may still differ. Bourdieu [22], [23], Whitley [13], [24], [25], Ziman [26], and authors arguing from the point of view of "economics of science" [27-29] belong to this group as does the early work by Latour and Woolgar [30] or by Hagstrom [1]. Recently, van Rijnsoever et al. [31] pointed to similarities of the "resource-based view" from organisational sociology as a similar concept. Basic elements in this approach are presumably that science is considered to be a field of cognitive development but also a social field in which actors interact like on a scientific market. Scientists are probably driven by curiosity but more importantly so by social recognition (reputation) and material advancement of their status in the scientific community. Scientists have individual career interests. As in all markets, the producers of the scientific good are in competition with each other and the use of scientific power and authority in order to gain competitive advantage are important elements in this competition. The dynamics of science, including scientific innovation, are therefore profoundly influenced by competition and social conflicts in the scientific community.

"newcomer" cannot hope to find immediate praise among those that work in established "cognitive institutional units of science" as research institutes, departments, faculties etc. As Becher and Trowler contend, referring to Crane and Spiegel-Rösing (2001: 172): "Whatever their origins may be, emergent disciplines must face the competitive demands of those which are already established (…) If the newcomer is seen as a threat to established interests, or as a rival claimant for the available resources, its development is likely to be inhibited". Disciplines or specialties are "constantly developing strategies of status maintenance" (p. 173).[2]

On the other hand, there is a widespread consensus among sociologists of science that cognitive differentiation is not only a natural feature of scientific development but also a functional must of scientific development. There are two reasons given for that [32]: one is a cognitive one stressing that the constant search for new knowledge leads to an ever-stronger elaboration of different aspects of the complex world around us. The second reason refers again to the social world: cognitive fields are also domains of recognition for scientists, the base to search for "scientific capital" scientists need in order to acquire positions within the scientific "champs". New scientific fields often increase chances of scientists to acquire such capital because competitive pressure is usually lower than in existing and older scientific fields.

So, while attempts of cognitive differentiation will invariably occur, any new field will have to confront the interests, authority, and power of the existing order of cognitive division. In order to estimate the chances of success of becoming part within this division, it is important to understand the conflict level an integration can raise. In order to do so we need a concept that can spell out such conflict levels.

There are many different ways to systematise the "reduction of complexity" (Luhmann) by disciplinary differentiation and de-differentiation [33-38]**.** Taking in a "conflict view of science", one can propose to distinguish four possible ways of the institutionalisation of new cognitive fields in the "scientific champ": by multiplication of currencies; currency devaluation; currency competition; and currency dualism.

[2] Or in the words of Bourdieu [23: 28]: "The dominant are committed to conservation strategies aimed at ensuring the perpetuation of the established scientific order to which their interests are linked".

We use the term "*currency*" as a synonym for Bourdieu's "scientific capital" as a particular form of "symbolic capital". However, the term currency indicates in addition that there is not one scientific capital but a number of different types of scientific capital, i.e. currencies, that are valid in different cognitive fields of science. Scientists are therefore not striving for the same scientific capital but for a specific type.

B. Types of Cognitive Differentiation

1) Multiplication of Currencies

This is the main way of science in dealing with complexity, i.e. by differentiation of the existing disciplinary field in two or more subfields or specialties or, on the level of specialties by the creation of a new subspecialty. If the new specialty (or subspecialty) is cognitively sufficiently distinct from existing specialties, this process of differentiation comes down to the creation of a new "currency" which is distributed only within the new specialty while the currencies in existing specialties maintain their value. Expressed differently: scientists within the existing specialty maintain their "exchange value" for the "products" they deliver. This kind of complexity reduction is called "*fission*" in the literature [14] or "*subject parturition*" [39] and usually does not lead to conflict among the "Haves" – those working in existing and recognised scientific fields – and the "Have-Nots" – those investing into a new cognitive field of science - as long as there are no conditions of a zero-sum game when for example material resources shrink and redistribution has to take place.

2) Currency Devaluation

A second case is the rise of competing paradigms within an existing scientific field. This might happen by "*subject dispersion*" [33]. For example, one might have a paradigm in one discipline that spreads over into other disciplines (or into other specialties). An obvious example would be rational choice theory, which was "invented" in economical sciences but has spread into most other social science fields. Another example is the rise of a new paradigm within a discipline or specialty on the base of the use of a different theory, method or technology contesting the "authority of interpretation" of existing theories, methods and technologies. In this case the existing currency remains valid but the exchange value of scientists adhering to older paradigms is questioned and may devaluate if the new paradigm gains ground. Such a development creates strong

conflicts and comes down from times to times to the "scientific revolution" Kuhn has described [40].

3) Competition of Currencies

A somewhat similar conflictive development may arise if two cognitive fields deal with the same subject area but on the base of different paradigms or if "internally" generated paradigms are confronted with "external" paradigms, external here meaning cognitive fields that come into being by the "interaction between academia and the world that lies beyond it confines" [8: 171]. Such paradigms often are a response to demands from stakeholders in other functional systems [15], [37]. In the literature on "Mode 2" [41] it is even contended that this type of differentiation may be the way most new scientific fields today find their origins.

Competition arises when the new "external" field attempts to create an own currency and become an immediate competitor of the existing scientific field dealing with the same subject area from an "internal" point of view. In this case, both currencies may claim their validity and there is a clear competition for dominance both in terms of "status" within the academic community as well in terms of "economic capital". There is therefore an imminent danger of devaluation of the existing "internalist" scientific domain once the new "externalist" field is installed. An example for this can be the still ongoing search of "public health" for academic recognition in health matters, a field in which the medical academic community tries to maintain its authority of interpretation.

4) Currency Dualism

The final type of differentiation is what is called in the literature the "*fusion*" of cognitive areas or the creation of *interdisciplinary* fields [14]. In this case scientists are working in a new cognitive domain in which in the beginning no currency exists. There is, of course, a strong interest in creating such a currency to validate the investments scientists have made. If this succeeds, it will be just another case of currency multiplication, meaning that a new sufficiently distinguished area has come into being. However, as long as there is no new currency, all scientists working within this field remain anchored within their old disciplines or specialties and depend on their exchange value for these currencies. This gives the existing two (or more) mother disciplines/specialties the possibility of "claiming" the new field and to integrate it as a subordinate part. Currency dualism

designates this process: within the new interdisciplinary field two (or more) kinds of currencies have still their value as long as there is no new "third" currency created. This can lead to conflicts for dominance among "mother disciplines" which try to get grip on the new field.

The different types of cognitive differentiation have been built so far on the argument that conflict between "Haves" and "Have-Nots" arises whether the "scientific authority of interpretation" of the "Haves" is contested or not and whether this happens inside scientific disciplines or specialties (currency multiplication (not contested) and devaluation (contested)) or outside either as fusion with other disciplines or specialties or in contact "with the outer world" (currency dualism and competition). Scientific authority of interpretation is pertinent for the social status of scientists and their scientific capital.

There is, however, a second conflict dimension playing a role in the calculation of scientists and institutionally established cognitive units like departments when considering the integration of new scientific fields in universities. This other dimension are the "material resources" or the "economic capital" scientists need to continue their "reputation cycle" [30]. And also the cognitive units scientists are working in inside universities depend on the constant generation of material resources for their reproduction. The arrival of "Have-Nots" can have different effects on material possessions of the "Haves": it can mean additional resources, if the new scientific field manages to bring in money from outside (for example by the help of funding agencies or stakeholders), but it can also mean resource competition, if the available money for a department does not rise accordingly to the integration of new disciplines. In this respect, "affluence" (more resources) and "scarcity" (stagnant resources) play a role in the individual and corporate evaluation of advantages and disadvantages of the integration of new scientific fields.

Expectations about the consequences of an integration of new fields on the social status and material resources of scientists and their cognitive units determine the way they will react to the rise of a new scientific field. The following table cross-tabulates these two conflict dimensions by, one, assuming that the material position of scientists and their cognitive units will either not be affected or that they will be affected if the new

field is integrated; and, two, that the social status can either be endangered or not by the integration.

Table 1 Conflict Dimensions

	Material Resources not affected	Material Resources endangered
Cognitive Authority not affected	I (no conflicts)	II (resource conflicts)
Cognitive Authority affected	III (cognitive conflicts)	IV (strong conflicts)

The "Haves" can strategically react in different ways to deal with these types of cognitive differentiation.

(a) First, they can accept the new field by granting the status of a subspecialty or specialty with equal rights to others, a strategy one could designate as "*peaceful co-existence*". This is a likely strategy when the "Haves" expect "Sector I" as an outcome of integration, i.e. the sector with no major conflicts. We will find this strategy most of the time when currency multiplication takes place and affluence is the resource condition.

(b) The second strategy would be "*subordination*". This seems likely when a conflict in cognitive authority appears (as in the case of currency devaluation or dualism). Subordination means to integrate the new field into the department but to grant it a lower social status compared to the status of the "Haves". Different institutional strategies are possible here. Ben-David has explained how subordination has taken place in Germany at the end of the 19th century, when chair holders claimed a general authority over disciplinary developments within universities and specialties or subspecialties could only find a place in the

research laboratory of the professor without the status of a professor. A second institutional strategy was to make scientists with a "habilitation" to "Privatdozenten" that had no paid position in the faculty and, hence, no claims of material resources. Again, the title of a professor was lacking. Often, these Privatdozenten were bearers of new scientific fields. So, the refusal to grant the title of a professor and the positioning of scientists in research centres that depended on a chair were possibilities to exercise subordination of new scientific fields.

(c) Contesting paradigms (currency devaluation) could however also face "*exclusion*", a strategy the "Haves" might try to use when they are seriously challenged by both a loss in social status and material resources. If a contesting paradigm would at the same time mean a loss in material resources because subordination is not possible or too costly, then exclusion is the most reasonable strategy to maintain dominance for the "Haves". Exclusion mean to keep the new scientific field outside the faculty or even the university and give them no institutional position. This could also be a strategy against "currency competition" coming from outside.

(d) Still a different strategy against currency competition or devaluation could be "*marginalisation*", meaning that new scientific fields are accepted within the faculty or department but, in order to avoid material losses or competition, they receive an inferior organisational status with for example few resources and a diminished guarantee of organisational survival etc..

These considerations demonstrate that there are different individual and institutional strategies for the integration of new scientific fields and the perception of "threat" by the "Haves" is an essential element to determine which one of these solutions will be chosen.

Table 2 Likely strategies in cognitive differentiation

	Material Resources not affected	Material Resources endangered
Cognitive Authority not affected	I (no conflicts) *Peaceful Co-Existence*	II (resource conflicts) *Marginalisation*
Cognitive Authority affected	III (cognitive conflicts) *Subordination*	IV (strong conflicts) *Exclusion*

III. University Governance and Cognitive Structures

Universities, it was argued, are the main place for disciplinary reproduction. It is within their confines that scientists develop institutional strategies of acceptance or rejection of new scientific fields. The conditions, however, to do so, vary – and this is our hypothesis for the remainder of the article – according to *governance structures* of universities.

Governance can be considered to be a very broad notion indicating how rights and obligations are distributed, how the different parts of universities interact, but also how relations with other universities as well as stakeholders are organised. Governance structures therefore "who gets what, when, and how" in universities and determines to a certain extent the strategies individual and corporate actors inside universities have at their disposition.

The main thrust of the following argument is to understand whether the change from one governance model (that is the "bureaucratic-oligarchic model" [42] to another ("new public management") does affect the cognitive dynamics within universities and,

if so, how[3]. The bureaucratic-oligarchic model – Clark speaks of the "academic oligarchy" in his well-known triangle of university types – has been dominant in most European countries since the 19th century, France and the United Kingdom being notable exceptions. The new public management model – with all its variations – has started to substitute this model since the 1990s (see only [43]). Both models follow a different governance logic. We will first discuss the relationship of the bureaucratic-oligarchic model (BOM) and scientific innovation and then the likely implications of the new public management model (NPMM).

The description we are giving is ideal-typical: It accentuates those elements that seem to be the most distinguishing traits vis-à-vis other types.

A. The Bureaucratic-Oligarchic Model

In order to describe the relationship between governance structures of BOM and scientific innovation we will refer to a number of variables that we consider as important for the working of governance models:[4] the mode of coordination in the university systems; the ideational frame of reference of universities; the role of the management/ administrative layer; the significance of "university capital"; the organisation of the "activity structure"; the interaction or games played between scientists.

1) Mode of Coordination in University Systems

It was Ben-David who has in his comparative-historical studies prominently pointed to the importance of modes of coordination in university systems. He found that there is a beneficial role of decentralised and competitive modes of coordination with regard to scientific innovation [5]. Ben-David's argument was that universities will be more willing to adapt their structures and learn from "best practices" if they are in a competitive fight for recognition in the academic community and for material resources

[3] The bureaucratic-oligarchic model has been one model next to others, though it has been probably been the one best diffused in Europe. France and the UK differed from this model [5] as did the East European countries. We will only focus on the transition from BOM to NPMM as space and time in this article are restricted.

[4] Such variables have been subject to frequent discussion in the rich literature on university and governance types [see only 9], [24], [42], [44], [45]

among stakeholders and if there is no centralised state organisation that has an interest in steering the university system. Decentralisation in the form of federalism or in the form of an important private university sector helps to develop competition among universities. The USA have been the main example in this respect.

Competitive systems create an entrepreneurial spirit in universities and force to develop a tighter coupling of the cognitive units and individual scientists than is the case in universities that work like "organised anarchies" [46] which is the case in the BOM. There is a strong functional pressure to develop a capacity of flexible reorganisation of internal structures being able to adapt to external challenges. This has negative effects on the capacity of scientists to veto structural change within the organisation.

Universities in the BOM by contrast are usually state-subsidised and lack the competition of private universities. They are not equipped with steering capacities to adapt the organisation on own accounts for important "power means" remain in the hands of state governments. The pressure to adapt must come from the political side (hierarchy as mode of coordination). As a result the capacity to change is in general low.

2) Ideational Frame of Reference

The general "ideational" orientation of universities is a corollary to the structure mentioned above. Braun and Merrien demonstrated on the base of Ben-David that university systems are subject to different ideational "frames of reference" that are deeply anchored within politics and society. While the "market systems" honour until today a "service orientation" of universities, the BOM propagates a "cultural vision" of science [47], [48]. What does this more in particular mean?

Ben-David demonstrates for example how German universities in the 19th century acquired "academic freedom" in exchange for not meddling with societal affairs, which led to an ever-stronger encapsulation of these universities with a strong emphasis on the value of theory and scientific progress detached from societal influences [5]. This orientation of universities was accompanied by the support of the uprising bourgeoisie, which saw higher education as the main instrument for enlightenment, a means of liberation of the individual. These factors contributed to the stylisation of science as a "cultural value" of science. Other European countries followed this orientation.

Institutional encapsulation and detachment are therefore typical characteristics of such an ideational orientation. They create conditions of academic enclosure and conservatism and prevent easy integration of new elements like new scientific fields.

These tendencies made universities and university development part of the internal dynamics of the scientific “champs” that were played out within universities. The opening to new scientific fields depended on the willingness of the “Haves” to accept such new fields and this again depended on the “types of cognitive differentiation” sketched above.

3) The Management Layer

In the BOM, the role of the administrative or management layer in universities is typically weak as procedural autonomy is very small. The state has a marked influence on procedural development by the distribution and controlling of financial flows. To this are often added "substantial rights" of the state like the nomination of personnel including the nomination of professors and decisions on the organisational structure and infrastructure of universities. Only contents of teaching and research are mostly free from state interference. The effects on the internal organisation in the BOM are such that - given that the management layer as an intermediary level is lacking power and competence – “self-organisation” of the academic community in universities and internal dynamics can take place. The power of policy-makers to reorganise university structures in this context is most of the time a limited one: it exists in the approbation of propositions coming out of universities and not as a pro-active right to change universities on own account. Again, this favours organisational dynamics in universities based on the competitive “logic of academia" as sketched above. The most likely type of scientific innovation under such conditions seems to be "currency multiplication" as it does avoid conflicts with the “Haves” within universities.

4) University Capital

University capital is the symbolic recognition conferred by the university for various kinds of performances of scientists and their departments (teaching, research productivity; stakeholder contracts; communication with the public; participation in decision-making bodies of the university). Which of the performance indicators matters in what priority order depends on the historical context and the type of university.

University capital is of interest to scientists in two ways: one is that it may allow gaining access to important administrative positions within the university[5] and, second, to be entitled to obtain in exchange for this recognition a certain amount of economic capital from the university.

University capital is of small interest for scientists in the BOM and can therefore not be used in any strategic way by the management layer because of two reasons: university management does not have sufficient economic means to confer independently economic capital to scientists. Spending is constrained by rules, regulations and approval by the state. And if there is little economic capital, participation in decision-making boards is less attractive though there may still be some leeway in the nomination of professors and in the agenda-setting of structural questions. University capital is, one can contend, a form of capital not much searched for in contrast to other forms of capital like scientific capital or economic capital granted by funding agencies. The important point in the context of this article concerning university capital is that it cannot be used as a steering resource in the BOM or, in other words, as an incentive for scientists. This diminishes the possibilities of the management to intervene into the "self-government" of academics in universities.

5) The "Activity Level"

The activity level refers to the organisation of those who perform in the university. An activity structure means those structures in universities that organise the main functional activities like teaching and research. The institutional division into faculties, departments or institutes, for example, is part of the activity structure as is the existence of teaching boards or committees. The interaction between scientists, structured by these institutions, is another part of the activity level.

A main difference between the European BOM and the American market model, highlighted in the literature, is the organisation by "chairs" in the BOM and by departments in the market model. We will only discuss the former one.

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[5] In fact, Bourdieu uses the notion of "capital universitaire" exactly in this sense of having administrative power in the various decision-making boards within universities [22]. The participation in such boards is itself a kind of capital one can use to advance own interests (by distributing money; employing people etc.). We prefer to speak of administrative capital if it concerns the capital based on the participation in decision-making boards and reserve the notion of university capital to the symbolic recognition of the university in a more general sense.

The typical organisation of scientific fields in the chair system is a strongly hierarchical and centralised one. It is the “full professor” who is responsible for a wider cognitive area of knowledge, mostly a discipline, while specialties and subspecialties have to be put - as already mentioned above - into a subordinate position in relation to this chair or be excluded altogether from positions at the faculty. The chair system confers substantial powers to the “Haves” who can almost monopolise large cognitive fields and determine the entry conditions for “newcomers”. This alone makes us expect a conservative bias: in the chair system cognitive differentiation, which raises conflicts with the social and economic status of the “Haves”, stands no chance of being accepted.

But the chair system has another conservative effect Schimank has described by looking at German universities in the 1990s [49]. This effect, in fact an interaction effect, is based on the large degree of "academic freedom" the chair system grants to professors and their almost independent position within the department and the faculty. This means that conflicts in the department or the faculty find actors that have completely equal rights and degrees of freedom. Hierarchy as a principle is of course excluded as a resource in the self-organisation of the university. The only actor who can use this mode of coordination is the state itself, which can contest for example the nomination of professors.

Academic freedom and independence of professors lend itself to a game of "*standstill*". What are the attributes of such a game?

Schimank discussed the case of resource distribution in university departments and faculties. The point of departure of the game that unfolds in BOM is that professors as actors have all equal power resources and rights. In order to gain resource advantages by redistribution, a professor would need the support of a majority of other professors in the department and/or in the faculty as decisions in the self-organisation of BOM are based on majority decisions.

Schimank demonstrates that finding majorities is extremely difficult under the conditions sketched so far:

- Redistribution is unlikely because scientists act risk-averse: they must think about the consequences of their action and what this might mean in the future. As redistribution results in winners and losers, it can be expected that those who bear the costs of the redistribution will – given another feature of BOM, i.e. the low outward mobility of

professors and, hence, the relative certainty that one will confront colleague professors for a long time in the same department – seek to retaliate in the future when the next occasion arrives. And, as they are losing, they will use all available means to avoid the loss in the present. Resistance will be strong.

- At the same time the professor who has taken the initiative cannot be at all sure that, even if he or she succeeded in building a majority coalition among colleagues, that this majority coalition would hold in the future. Academic coalitions are typically ad-hoc and therefore unstable. In addition, it needs considerable transaction costs to organise such coalitions.

- Though deans might have some powers in this game – though they will be limited - it is unlikely that they will use them as deans, too, must fear to become the object of retaliation in the future. Their office-holding is limited in time and, within the rank-and-file they might suffer the consequences of their decisions. Rather, deans will, especially if they aspire for a renewal of their position, prefer a policy of "blame avoidance" that makes it unlikely that redistribution is taking place.

With these structural characteristics – all actors with comparable power positions and relative independence; the lack of hierarchical authority and the absence of incentive systems; the low mobility of actors petrifying established actor relations for a long time leading to a weak discounting of the future - the most prudent strategy is indeed to avoid confrontation and accept the status quo. No overriding general objectives of universities exist that could change the logic of this game. The result is "*informal negative coordination*", an implicit contract to avoid negative consequences of own action, which leads to extreme difficulties to redistribute resources and, hence, to change the institutional cognitive structure. Inclusion of new fields can under these circumstances only take place if inclusion would be "Pareto-optimal", i.e. has no negative consequences for any professor in the department or faculty. These conditions are in our typology of "currencies" once again only fulfilled in the case of "currency multiplication" under conditions of affluence. In all other cases the "non-aggression pact" would be the outcome of the game and, hence, new scientific fields could not be included.

In sum, BOM demonstrates governance features that structure opportunities for scientific innovation in a very constrained way: it is currency multiplication, which can

find acceptance within universities as the cognitive and social status of the "Haves" is not jeopardised. But this only holds if the inclusion of new scientific fields does not generate resource conflict. Only then will we have "peaceful co-existence". In case of resource conflicts, for example, because universities are confronted with severe austerity measures, the situation changes and even currency multiplication can be refused or at least will result in marginalisation strategies to avoid any material conflicts.

Did New Public Management change the opportunity structures?

IV. Governance in the "new public management model"

The main question in this part is whether the reforms of governance that have taken place in most countries and particularly so in Europe have changed the institutional conditions and "games" that are played within universities in such a way that the capacities of universities to answer to the increasing "diversity" of science are improved. We will discuss the changes in two parts: the first part discusses the structural changes in the governance mode that have taken place and assess their possible effects on scientific innovation. The second part looks into the kind of games that unfold under the NPMM.

A. Structural Changes

Our analysis discusses the NPMM in ideal-typical terms, i.e. we do not refer to one particular subtype or variation in the numerous ways that NPMM can be institutionalised [43], [50-53]. There are for example different ways to organise the authority structures, i.e. the competences between university direction, political stakeholders, university boards and academic representation boards. Departments may have a global budget of their own or get their budget by the faculty. Deans may be chosen from within the academic university community or they come from another faculty or even from outside the university. They may be nominated by the leadership in the university or be elected etc. These are all possible variations – and there are others – that change aspects within the general framework of NPMM without touching upon the main characteristics like the delegation of operational management from political actors to the university; the strengthening of the role of leadership within the university, the

transfer of global budgets to universities and the conclusion of “contracts” which are built on strategic discussions between policymakers and the university and, often, also stakeholders; as well as the creation of a more competitive environment and performance-oriented payment. When we discuss the relationship of NPMM and scientific innovation we often push conjectures to the extreme, i.e. an ideal-typical case which gives leadership vast powers within the university, a competitive environment is working, departments have own budgets etc. though often university will have experienced more moderate changes on different structural variables. The rationale of this procedure is to demonstrate the logic of development of the NPMM in contrast to the bureaucratic-model. This is how the university should look like if the main ideas of the new public management model would have had all liberties to realise their ideas.

1) Mode of Coordination

Universities in NPMM have experienced a transition from an almost competitive-free environment to a more competitive environment that is created by the introduction of a stronger performance-based financing by the state and concomitant processes of evaluation and accreditation that reveal individual performance by universities (for a good summary of this transition see [54]). Though “intensity” of the political pressure varies between countries in this respect, almost no universities can escape to develop strategies of improving its image and performance in comparison to other universities in the system and even on the international scale. The changes force universities to strengthen corporate identity and a competitive profile with a strong impetus to become a “corporate actor” [55] in its own right. As a corollary, this leads to the need for a stronger management layer.

2) Ideational Frame of Reference

The ideational frame of reference is changing. Next to "academic freedom" as the main and only orientation of universities in the bureaucratic-oligarchic model and "services to society" as the main orientation in market systems, enters "*efficiency*" as an additional and often predominant criterion [56]. The organisational philosophy that lies behind this frame of reference has the same effect as the competitive environment: it pushes universities to consider and assess their organisational performance in terms of effort, performance and cost-effectiveness. This strengthens the transition to a corporate actor and abandons the loosely-coupled form of internal coordination valid in “organised

anarchies". Efficiency can only be achieved if certain changes take place within universities: strategies must become an integral part of organisational action; the powers of “leadership” within the institution must be strengthened [57]; the basic institutional units of universities need to be bound by these strategies meaning that they comply to overall objectives and make them an integral part of their own logic of action [58]. They become more tightly coupled.

3) The Management Layer

Competition and efficiency as an additional and dominant frame of reference push – this has been said – to the transformation of governance relationships: The former governance dyad - the academic faculty on the one hand and the state on the other - now makes place to a governance triad because of the strengthening of the intermediary administrative level with widened resources to steer and guide the university. How exactly the authority relations within the triad are settled, depends on countries. As already said, there is a lot of governance variety here but whatever the exact distribution of authority, the management layer and the university leadership respectively have an important part to play as it is the task of this layer to build the university as a corporate actor and to negotiate strategies and structures with policy-makers. The obvious difference of the NPMM with the market model is that NPMM is built on a triad including the state while the market model is very often – and this also concerns the public universities – a dyad built upon private stakeholders and the university management layer.

4) University Capital

Decentralised global budgets for universities and the power to develop and implement strategies now renders "university capital" a more attractive type of capital for scientists. In the BOM with centralised politically administrated budgets and lack of procedural freedom, the university itself had seldom room for manoeuvre to distribute own resources or at least only limited authority. With decentralised budgets and procedural freedom this changes and it becomes worthwhile for scientists to obtain such capital in order to for example obtain institutional resources for teaching and research or for increasing own standing and positions in the resource struggle within departments and faculties. University capital, on the other hand, can now be used by the university leadership as an incentive system to influence scientists’ decisions.

5) The "Activity Level"

At the activity level various changes take place.

(a) First of all, as in the market model, the status of a scientist in the university becomes more dependent on continuous scientific accomplishments and less on career positions as in the BOM. In the latter model the performance of scientists is measured each time a new career step is taken until the position of a full professor is reached. Any evaluation of performance from this step onwards is unusual, at least within the same university. In the market model evaluation of performance continues also after tenure and competitive pressure among scientists is upheld. The NPMM introduces a similar competitive orientation, as the measurement of performances of professors becomes more frequent and transparent, facilitating a comparison of scientists' performance. This does seldom lead to strong negative sanctions like for example loss of the job but strong competitive performance becomes a prerequisite for the acquisition of university capital and therefore for individual material advantages of scientists. It has an effect on the relative position of power of scientists within the faculty and departments. While before professors have all been equal, the individual weight or influence may now differ according to the value of university capital thereby contributing to new "games" that are being played (see below).

(b) At the same time, it seems that the corporate identity of the academic university community, which manifested itself in the "self-government" of universities, draws to an end. The increasing differentiation of the academic workforce [59-62] destroys "common interests" of the academic community vis-à-vis university leadership and stakeholders. The more flexible work contracts, the possibility of performance-based payment schemes, the tendency to grant younger scientists early positions of independence within the academic corps (e.g. by the introduction of tenure track positions), and the proliferation of unstable positions within universities, all contribute to a fragmentation of interests of scientists as a "labour force" reducing also its veto-powers within the university [63]. This gives the "executive leadership" a stronger weight in decisions, even on the faculty and department level, and introduces, hence, a more strategic-based reasoning in decisions on the institutional structuring of the cognitive space in universities.

(c) The more flexible ways of employment become resources of the leadership, which employ new scientists more and more according to general university development strategies. This can create opportunities for young scientists and new scientific fields to become more quickly incorporated into universities if the leadership has priorities in such areas. The dominance of the chair and its hierarchical position in the cognitive domain gives more and more way to a more flexible and often changing composition of the academic workforce in universities. Again, this increases the flexibility in the creation of professorships and, hence, the opportunity to give new scientific fields a chance.

(d) On the institutional level we find a similar differentiation: strategies of universities to distinguish themselves from other universities in a more competitive environment as well as the rise of university capital lead to the build up of more research centres and research groups, of - as Burton Clark has indicated in his analysis of European entrepreneurial universities [64] - of “semi-peripheral” and “peripheral institutions” more directly linked to the wider public and stakeholders. Together with the increasing number of resources stemming from third party funding, this leads to a fragmentation of the former relatively coherent organisation of the cognitive “space” in universities and opens, of course, chances for new scientific fields to gain ground in universities by this indirect way of inclusion. The rise of semi-peripheral and peripheral institutions contribute moreover to an opening of universities to the "applied context" increasing in this way the possibility of "currency competition" and "currency co-existence".

(e) Decentralised budgeting can lead, though there is still wide variety in this among he NPM universities in different countries, to the strengthening of departments as relatively independent units of universities thereby weakening the faculty as the main arena of deliberation. Departments become "own enterprises" with stronger "corporate identities" of their own, in addition to their distinctive cognitive identity vis-à-vis other departments. This strengthens the affiliation of individual scientists to departments as well as the importance of departments in the university capital distribution game. Again, this contributes to a strengthening of a strategic orientation, this time on the department level. Individual scientists are now obliged to not only defend their own interests in the struggle for dominance but also the “common interest” embodied in the fate of the department. Games become more “mixed-motive games” than before and

positive coordination instead of negative coordination becomes a realist option (see below).

B. Games and Dynamics in Universities Under the NPMM

We will highlight games and dynamics on two analytical levels: first, the level of individual scientists in a same department who have to decide whether they will give their consent to the integration of a new scientific field in their department. Second, the level of decision-making bodies in the university, including the leadership, faculty, departments and deans.

One can assume that – on the base of the structural changes sketched above – four components in the game for the cognitive composition of universities change with NPMM:

- The "*size*" of the department or faculty becomes a relevant element in the preference formation of individual actors. As the university changes to a more competitive environment itself and university capital turns into a relevant form of capital both for individual scientists and organisational units, size, i.e. the number of scientists – above all professors –, is a relevant variable for the determination of relative power in the university. The larger the size of a department, the more votes in decision-making bodies it has and the more claims for resources it can legitimately express. Size is, however, not only a blessing but must be weighted against the additional costs that are involved with the integration of new fields. As long as the sum of costs and benefits is positive, there is an incentive for inclusion.
- The possession or gain of material resources becomes more important than before. This not only can lead to a higher intensity of conflicts between scientists and between cognitive units but draws also attention to the material contribution a new field can bring in.
- Material gains also influence positively the readiness to accept semi-peripheral and peripheral institutions, thereby opening new paths of inclusion even in the case of currency competition, though this might still occur under strategies of marginalisation and subordination;
- Finally, the role of leadership influences the outcomes of games on the faculty and department level.

If we take this as a starting point to understand the stakes in games for the cognitive composition of universities one can conjecture the following about individual games:

1) Individual Games

What counts for scientists, as stipulated above, is cognitive authority which grants social status and material rewards or, in other words, economic capital. Now imagine professor X who is more concerned by the integration of a new field because the new field is cognitively proximate to his or her field. Next to him are all other professors who are less concerned because their specialty is sufficiently distant to the new field. What will be the game?

1) Currency multiplication

NPMM does not change the relative openness of professors towards inclusion of new scientific fields in the case of currency multiplication where the new field is sufficiently distinct in cognitive terms so that even professor X will not be concerned about his or her authority of interpretation. What changes is, however, the rationale of selection of new fields. While recognition by the scientific community has been the main driving factor for the inclusion of new scientific fields in the case of BOM, it now becomes also important what the new field might "bring in" in terms of material resources but also in terms of reputation and social status for the department. A very renounced scholar working in a new field will be more welcome than a young scientist, brilliant but not yet famous enough to add to the scientific status of the department. And a scholar who brings in a new field with additional resources from third party funding does not only circumvent possible redistribution problems but might even add to department resources by overhead etc. Though pressure from the wider academic community for the integration of new fields will still count, material resources give an advantage to new fields to become incorporated.

Currency multiplication will find no obstacles only in times of affluence, though. If integration by contrast means immediate or future loss of resources for professors and if this concerns a majority of professors in the department, the chances decrease considerably.

2) Currency devaluation

The game is a different one if currency devaluation is at stake. In this case the authority of professor X is contested. His position will be ambivalent. On the one hand, she knows that monopolisation strategies will be the best strategy to avoid future loss in scientific recognition and she might try to convince colleagues to either exclude or subordinate the new field (e.g. by not granting a professorship). On the other hand she now should be concerned about size effects of the decision as the employment of a new professor can add to the status of the department and, hence, to future university capital of the department with positive side-effects for members of the department. If the new field can be subordinated, professor X might in this case opt for inclusion, balancing the advantages of inclusion against the possible threat for own status. Subordination is a strategy that diminishes the risks in this case. If the professor is risk-averse she will, however, opt for monopolisation and discard the size effects. In this case exclusion might be the best strategy.

This is different for the other professors who are not directly challenged by currency competition. They are above all sensible to size effects. They would welcome the addition of a new scientific field in the department as long as this means no resource competition (condition of scarcity). Therefore, under conditions of affluence, currency devaluation can take place because professor X will find no majorities to exclude the new scientific field. If, however, there is scarcity of resources and imminent threat of redistribution and loss of resources, the other professors will join professor X as they are now negatively affected by the new field.

3) Currency competition

In the case of currency competition all professors feel cognitively threatened and monopolisation strategies leading to exclusion or marginalisation will be the answer in the same way as has been the case under the BOM. However, as indicated, material aspects are now starting to matter more seriously under the new regime. Either as a consequence of a period of scarcity or linked to general university strategies promoting stronger links with stakeholders, the inclusion of new fields that bring in additional resources (research institutes that have direct contacts with stakeholders or which are able to generate funding resources from funding agencies) becomes more amenable. It will not change, though, that monopolisation remains the first priority of the “Haves”

and that subordination (not granting professorships) and institutional marginalisation (in the department) will be the dominant strategies. This is why Clark still speaks of semi-peripheries and peripheries: semi-peripheral and peripheral institutions are associated to departments and faculties but they do not have the same status as the already institutionalised fields.

4) Currency dualism

Finally, concerning currency dualism, we might find relative cognitive indifference concerning the development of interdisciplinary fields as long as there is no new currency unfolding. With regard to material aspects, however, professors and departments will try to maintain a grip on the resources (manpower, research money) linked to the development of the new field and integrate the field into its own cognitive domain (size effect). Subordination strategies remain again most likely. The game changes, however, if the leadership interferes and expresses an interest in the promotion of such interdisciplinary fields. This brings us to the level of decision-making bodies.

1) The Corporate Level of Decision-Making

1) Inclusion of leadership into the game

The most obvious change in the governance structure is the differentiation of a more powerful and professional intermediary bureaucratic or professional layer within the university. Whatever the precise distribution of powers between university councils, university leadership, senates, faculties and departments, priorities of the leadership will play a role in the structuring of universities including the cognitive composition of faculties and, hence, nomination procedures. With the logic of the leadership, other organisational "rationales" enter into the faculty or department game [58].[6]

These rationales can interfere with the interests of social status and material resources of scientists and departments. They will certainly not always become the dominant

[6] Organisational goals may be to answer to "societal demands" as expressed by the potential number of students in a cognitive domain; to invest into "creative research" with possible widely visible breakthroughs in scientific knowledge; to develop the potential of younger scientists ; to establish links with stakeholders; to develop and support regional development; to support promising areas of research and still others.

objectives in strategic decisions but, as the "shadow of hierarchy" is now looming in all discussion of university decision-making bodies, they are at least always present in the discussion and cannot as such be negated. Several of them can also have positive effects on the integration of new scientific fields - like the policy to foster younger scientists, the support of promising areas of research or the concern for better links with stakeholders – and, hence, overcome conservative tendencies in the faculty.

2) Implications on the departmental level

The prevalence of the leadership logic is the more likely the more autonomous departments become with own lump-sum budgets and accountabilities. This is certainly still rather the exception than the rule in the world of NPMM but if it is the case this strengthens the power of leadership rationales within the university. The department must now pay more attention to its position within the university, to university capital and – in order to acquire such a capital – must be concerned with the acquisition of social status by academic reputation and economic capital. Both can raise the status of the department in the faculty. The integration of fields that seem to "pay off" in the future in this respect becomes more attractive and the build-up of semi-peripheral and peripheral institutions can become pertinent in this respect.

The department becomes a different organisational unit compared to the BOM. The more it receives responsibility to guide own affairs, the more a "corporate logic" is installed within the department linked to the mentioned social status and acquisition of economic capital as a collective attribute of the department – and not of the individual scientist. This is the reason why "size" may be a more important argument than the preoccupation of an individual scientist for his or her own social status, jeopardised by the inclusion of a new scientific field. The department creates a collective logic that does not allow anymore "standstill policies" in favour of individual interests. The instauration of the collective interests of survival of the department usually overcomes individual concerns. New scientific fields can still be refused if the costs of inclusion are higher than the benefits for the department. It is therefore the cost-benefit calculus of the department and not of individual scientists that matters.

3) Side-effects on strategies of scientists

There are other implications of the shift to NPMM.

The first one is that there are now new venues open for scientists in new scientific fields to be incorporated into departments, namely by lobbying on the level of university leadership. With NPMM it becomes attractive for the leadership to demonstrate competitive strength of the university by raising its social status among the scientific community and by increasing its economic capital. A scientist in a new scientific field with a high reputation stemming from his previous research or equipped with substantial resources by funding agencies (e.g. a centre grant) or by stakeholders (e.g. an endowment chair or a chair financed from industry) will find interest among leaders. They can then use their influence to convince the department of the advantages of the inclusion of the new scientific field. As said, the interests of the department in terms of social status and economic capital are now in many ways equivalent to the university so that it will not need too many arguments to convince the department – as long as not a majority of scientists within the department feel threatened by the new area or costs surmount benefits.

The second one is linked to the increasing differentiation within the academic workforce. Differentiation means a continuing fragmentation of interests, sometimes linked to different means of power the scientists hold within departments or in semi-peripheries and peripheries of the department. Scientists endowed for example with a major interdisciplinary research centre will have probably an interest in the inclusion of a new scientific field investigated by a high-rated scientist and often has the means to either finance – at least temporarily – the inclusion of this field or seek arrangements with department heads, deans or university leaders to incorporate this field. Scientists in close contact with industry may have their cooperative research lab with industry as a semi-peripheral institution and get sufficient resources to include new scientific areas within their own confines lobbying in the same way for full inclusion later on among departments, faculty and university leaders. In short, there are more and more ways, because of a variety of means to acquire economic capital and the immanent interest of cognitive units in universities to acquire such capital, to confront the "academic university community" with the inclusion of new scientific fields that would probably have had no chance in times of the BOM.

4) The role of the dean

Finally, it may be of interest to discuss the role of the dean as one of the key positions in the governance structure of universities. The dean has to represent the faculty, i.e. the collective interest of a group of disciplines or "sciences" (natural, life, social). Under the NPMM he or she will usually be stronger attached to the intermediary administrative level than this has been the case under BOM.

Under BOM, Schimank contends, no-one wants a strong dean. Everyone is satisfied with "standstill" policies and a strong dean would undermine the "non-aggression pacts" of professors. Under NPMM, however, interests in the power position of the dean change. Even if the faculty elects the dean, it is in the interest of this body – and of the individual departments as parts of the faculty – to have a stronger personality able to defend own interests in an increasingly more competitive and hostile environment. This would mean to endow the dean with stronger powers that can override to some extent individual departmental interests. His or her interests would be similar to the one of university leaders and heads of departments. They are all similar in attempting to strengthen their "cognitive unit" within the university, albeit on different aggregation levels. If decisions must be taken, the dean will decide in terms of the "profit" of a decision for the whole faculty. This means, if resources have to be redistributed, that such resources will be spent on those scientific fields that are the most promising in returns (reputation among the leadership; number of resources; output in terms of scientific productivity (or teaching, or links to industry, dependent on the type of university). If a new field "pays out" in these terms than the dean will not hesitate to decide in favour of such a field – as long – and here the logic is the same as the one of the department – there is not a majority of departments that feel threatened by the inclusion of the new field in terms of social or economic status. It is still the question whether the dean has indeed the means of power to realise the "logic of leadership" as Deem et al. notice [51] but if she has, the decision will be in favour of the principle of "most return" of a new scientific field.

In sum, it does not matter on which aggregate level we are in the university; considerations of costs and benefits (social and economic) determine decisions instead of individual interests of scientists or of the "academic university community". The "stop sign" is there where a majority of interests of constituent units of the cognitive unit is negatively affected by the decision. And – as long as the new scientific fields are seen as

currency competition – strategies of subordination or marginalisation will remain dominant within the decision-making unit. These strategies can be compatible with the general interests of the decision-making unit but if, for example, the attribution of an academic title contributes visibly to the status of the unit, such strategies might be contested.

V. Conclusions

The New Public Management Governance regime radically changes the "games" that are played among actors in universities in comparison to the former "bureaucratic-oligarchic model". While in the latter regime academic self-government and lack of procedural autonomy of universities contribute to a game of informal negative coordination, which leaves room for cognitive differentiation only in case of currency multiplication in times of affluence, NPMM tightens the coupling between the diverse cognitive units within the universities and makes strategic priorities of the university a strong part in the discussions on cognitive structuring of universities. The development of a corporate identity and the presence of a now strengthened university leadership as well as the stronger independence of departments makes positive coordination an imperative in the games that are played. This leads to a weakening of individual veto-powers and strategies in departments in favour of the pursuit of common objectives of departments. These developments have effects on the opportunities of new scientific fields to be incorporated in universities. First, though currency multiplication remains the most feasible option, a selection process on the base of "relative material value" of new scientific fields may set in. Second, cognitive differentiation by currency devaluation now has a better chance to become accepted as long as there is no resource competition. Third, currency competition becomes feasible though such scientific fields usually remain for some time in marginalised positions as "semi-peripheral" or "peripheral" institutions. The fragmentation of interests within universities and the increasing opportunities for lobbying raise, however, the chances that such marginalised fields become full-fledged parts of the cognitive structure in the long run. Finally, cognitive differentiation by currency dualism may be put under stronger pressure than before if "size" matters for the development of departments and faculties. In this case, early attempts of "takeover" of such interdisciplinary fields may prevail. It then needs

the active protection by university leadership to give such fields a chance to develop their own “currencies”.

All in all, these considerations give a rather positive outlook on the development of scientific innovation: under the NPMM universities seem to become more open with regard to the inclusion of new scientific fields which would meet at least some of the pressure which comes from the increasing “diversity” of science. The openness remains, however, strongly dependent on the presence or absence of resource conflicts that are generated by the inclusion of new scientific fields. We have demonstrated that the resistance of the “Haves” in universities is reduced under NPMM because material advantages for the majority of members in departments outweigh individual disadvantages in terms of social status. The creation of majorities will, however, fail if these advantages are not anymore given. It then depends solely on the authority of university leadership if it wants and can include new scientific fields.

Though openness of universities may increase, the new opportunities may not be equal for all scientific fields. This was indicated by the selection considerations in departments: if material advantages play a more and more important role, it becomes imperative for new scientific fields to demonstrate their contribution to the social and economic status of the department. New scientific fields, which fail here, have less chances to become integrated. This selection bias has not played a role under BOM.[7]

Finally, the new openness does not say anything about the effects the NPMM might have on the production of knowledge itself, i.e. on the "creativity" of science that is the base of scientific innovation. In this article we discussed the conditions of the possibility of the institutionalisation of scientific innovation and not the conditions of creativity. Concerning creativity, NPMM might have serious flaws as indicated in the literature by effects of this governance regime on the increasing burden of evaluation for scientists, which becomes as time-consuming as teaching and leaves less time for research; the pressure to raise research productivity, which contributes to more quantity of research output but not necessarily to a higher quality; the stronger focus on the more lucrative “external” innovation reducing opportunities for “internal” innovation with possible

[7] This is equivalent to what Lawn and Keiner have called the change from knowledge production, in which the “use-value” was relevant to a knowledge “economy”, in which the “exchange-value” determines the value of new scientific fields [65]

redistribution of university resources to these areas etc. In short, though institutional conditions for the inclusion of new ideas may increase under NPMM, the system may run out of ideas.

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