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Normativisation and its processes as seen from the neo-functional perspective: Towards science governance

The paper scrutinises the notion of normativisation as a concept met with only relatively rarely in the sphere of the sociology of science. The normativisation concept is here embodied in the neo-functional perspective, with a view to its relationship with the sociology of science being elaborated more deeply, and new analytical paths provided, in this case in regard to the understanding of science. The work underpinning this paper has sought to help make good the lack of relevant studies in the field of the sociology of science. The material presented comes from literature-based research, while the main axis is put on the highlighting of theoretical relationships between types of normativisation and sociological neo-functional theory in order for the inputs of Gunther Teubner in particular to be better grasped. As is signaled at the end, this paper is ultimately targeted at science governance, though this is in itself a notion requiring additional studies if it is to be viewed in particular contexts.

Keywords: normativisation, situational normativity, neo-functionalism, sociology of science, science governance.

Introduction

The concept of normativisation has here aroused interest in matters of the quality of science governance, with this paper revealing theoretically-based perspectives on the condition of science perceived both institutionally and organisationally. The issue of science discussed in the context of the sociology thereof is not met with very often as digital research indicates using relevant notions referring to science governance.

This paper seeks to focus on challenges affecting the pursuit of science and its quality using neo-functional theories. The key assumption is that, underpinning any form of governance lie specific ways of understanding shaped by various discourses. Here, these are referred to as processes of normativisation, through which a certain form of reality is being conveyed institutionally. In other words: what causes a form of reality/what factors are responsible for it? And, as regards science: what are the processes of the normativisation of understanding, and what types of rationality can deal with increasing differentiation?

In seeking to resolve these issues, this paper first presents findings from the neo-functional heritage, with a view to the processes of normativisation being name. These are then interconnected with the notion of governance, with issues of rationality raised in the process. The attention paid to these is justified in the context of the quality and transparency of developing science. While the concept of governance can of course be discussed from other perspectives, neo-functionalism offers a fruitful explanation that reveals ongoing dilemmas and identifies the processes accounting for them. Once the processes of normativisation have been laid bare, its governance-related challenges are detailed more precisely. In a more concrete sense, the matter of science governance is also raised, with a view to the ongoing processes that determine its quality being signaled.

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The notion of normativisation and a search for its sources

The term "normativisation" denotes the supply of a range of desirable ways of thinking

and behaving which ensure that the shaping of reality is made subject to certain standards. The underlying concept of "normativity" is in fact seen to have two meanings, i.e. an ontological one answering questions as to how all rules exist, and an epistemological one relating to the determination of the criteria and relationships underpinning action and judgement (Brożek 2013, p. 20–21). As Christine M. Korsgaard states: "Concepts like knowledge, beauty, and meaning as well as virtue and justice, all have a normative dimension, for they tell us what to think, what to like, what to say, what to do and what to be. And it is the force of these normative claims – the right of these concepts to give laws to us – that we want to understand" (Korsgaard 1992, p. 22).

According to Bartosz Brożek, the onset of the Renaissance and beginnings of the modern scientific era saw matters of normativity and its sources raised. In the context of modernity, answers are rooted in pairs of dualisms, i.e. objective vs. subjective theories and naturalistic vs. antinaturalistic theories. If these are put together, four sources of normativity are seen to appear, i.e. voluntarism, ethical realism, reflective endorsement and the appeal to autonomy. Voluntarism assumes the presence of a legal authority with the power to provide its community with norms – hence this perspective is both objective and naturalistic (the source of the normativity is outside the subject because the external source is capable of shaping norms and also forms part of a factual – 'measurable' – sphere). In turn, ethical realism (aka moral realism) claims that objective and antinaturalistic perspectives arise in line with an assumption that norms and values exist independently of a subject; while at the same time it is not possible for them to be scrutinised using methods characteristic for the natural sciences. As reflective endorsement states that norms are a form of our feelings and constitute a factual sphere, this is an approach based on subjective and naturalistic theories. Appeal to autonomy in turn relates to the Kantian categorical imperative of practical reason, which sets norms within an antinaturalistic area (as a source of normativity both subjective and antinaturalistic).

The presented sources of normativity can be mediated by different theories of rationality that can weaken or strengthen the particular source. Following Ludwik Wittgenstein's theory relating to abstractive rules that also correspond with Karl Popper's Third World, Brożek introduces criteria of rationality which, when taken up, can develop towards descriptive forms of norms and values, and the relations between them. Normativity can be identified with rationality because any criterion of rationality justifies a certain kind of normativity. Criteria of rationality are, for example: utilitarianism, instrumentalism, ethical moralism, etc. (Korsgaard 1992, p. 24 –25, Brożek 2013, p. 31–38). The concept of normativity clearly refers to the modern vision of science, in its assumptions as regards order, functionality, predictability, certainty, objectivity, normality and formality. However, a question arising concerns whether we are still allowed to formulate statements upon normativity within the framework of a post-modern science that is defined as uncertain, post-normal, full of contradictions, subjective, reflexive and heterogeneous (cf. Kacperczyk 2007, p. 8).

Put simply, normativity can be replaced by positionality in a post-modern world (Clarke 2003). However, another way entails situational normativisation (a perspective that maybe referred to as local conventionalism, after the work of Brożek). This view holds that there is no stable form of normativity which fulfills all related expectations and satisfies the needs of all involved actors. Instead, there is a range of various and unexpected situations and positions subject to constant change. Here a clearly defined set of rules, standards and values is lacking.

The formalisation of normativity as a legitimised and institutionalised set of norms can prove contradictory internally, and engaged actors can demonstrate and apply different situationally-determined values and standards of behaviour. Firstly, the sources of normativity can no longer be perceived as stable and certain; secondly, the achievement of normativity can be questioned; and thirdly, the effects of institutionally-introduced normativity cannot achieve goals prescribed previously. Hence the entire process of normativisation can prove unstable, contradictory and

post-normal, in the sense of becoming oriented externally against assumed values (Shakun 1975, Kirschennam 1991).

It is worth highlighting the division of normativity of meaning which provides us with three types, i.e. non-normativity, as well as external and internal normativity (Brożek 2013, p. 79–89). The primary sources on this refer to theories of language, but in this paper based on the sociology of science, the division of normativity is transferred to a sociological perspective. In the sociology of science, attention is paid to external, more than to internal, normativity. The emphasis is on external factors capable of making a difference as scientific endeavor is pursued. Science regarded as "pure" is empirically difficult to undertake, due to the many mediated factors which are the concern of the sociology of science. The key constraint concerns the matter of how and why what is termed science or scientific is defined or recognised. What makes some part of reality scientific? Why are some methods recognised as scientific? What is normativity in science? And how and why are the values and norms found in science rationalised and institutionalised? (Merton 1973).

It is in line with the concepts of normativity outlined above that a possible answer will be furnished. This paper taking its inspiration from neo-functional theory (as discussed further in the next subsection) has science perceived as one of several systems functioning under certain rules and codes specific to it internally, and it is in line with this perception that both internal and external forms of normativity will be analysed.

The notion of normativity and its sources can be very helpful as the matter of the understanding of science and ways in which it is governed are examined. The assumption here is that sources of normativity assessed by culturally/reflexively recognised criteria of rationality influence the final application/usage/recognition of science. Normativity external to science (the law, the system of communication, politics, networks of stakeholders, meta-organisations, etc.) colonise and are at the same time mediated by situational normativity (local contexts, local conventions, traditions, myths, rationalities and sources of normativity other than those recognised legally and mostly referred to as situational inter-subjectivity) with what arises from that being the internal normativity of science, as governed by its specific systems of rigorous rules of methodology and theory-building processes.

In other words, the system of science is here differentiated into the three sub-systems of normativity described as external, situational and internal. All are characterised by different criteria as regards the inclusiveness of norms. The external normativity of science is the most open normatively and cognitively, while the situational/local/contextual is relatively open normatively and cognitively. In contrast, the third, internally-normed science is, to use the words of Niklas Luhmann *normatively closed and cognitively open* (Luhmann 2007). This denotes an assumption that the core of science (internal normativity) is embedded into rigorous criteria by which science is made stable and almost unchangeable over any specific period of time (compare also with Kuhn 1962). It is worth explaining that normativity is treated as a cultural system which demonstrates its own logic – hence it is claimed that each category of normativity is also open/closed in normative terms.

As regards the sociology of science, questions arise as to the processes of the normativisation of (understanding) science, the types of rationality

Fig. 1. The kinds of normativity related to science.

Source: author's own preparation.

that can justify or modify the set of norms, and the concerns science governance can experience.

Reconstruction of neo-functional processes of normativisation

Neo-functionalism together with its previous version of functionalism have made their great contribution to the analysis of society as regards the assumed integrity and functionality of its institutions. In this paper, emphasis is put on neo-functionalism regarding its presenting value towards societal and communicatively based diversity and challenges given to law and governance which will be elaborated further. In this subsection, key processes encapsulated concern changes society is at present undergoing. The discussion below relates in turn to externally-based normativity, in which law and the discourse connected with it constitute factors influencing other categories of normativity mentioned earlier, like situationally and internally based normativity. Neo-functional processes of normativisation are taken from a legal body based around objective and naturalistic assumptions (the legal body remaining beyond the individual and also providing measurable policy). It is worth remembering that this external normativity is rendered more ideally by, and can be related to, Weberian ideal models, albeit ones in practice often interrupted by the situational/conventional forms of mentality and rationality that are the subject of a further section in this paper.

The processes of normativisation of understanding are formed on the three levels of society. The first level is recognised as generalised systems/functions of society also known as generalised symbolic media and consisting of law, politics, money, etc. The second level is defined as the level of knowledge-based discourse, which embraces a variety of organisations, semantics and programmes. The third level refers to the interactions underlying local forms of communication, differentiating a range of situations and means of argumentation thereof (Luhmann 2007). In line with these directions, normativisation is observable on these levels of communication. Science is contextualised as a system of communication affected by normativisation at the level of law and science policy, and shaping a systemic understanding of science more specifically in the direction of organisations providing programmes and grants and in general affording opportunities for research to be carried out. Further science is discussed at the level of interactions, in relation to which scientific inter-subjectivity can be questioned, argued, debated and also blocked. Each level of communication of normativisation demonstrates its characteristic rationality, where the notion is taken to be wider than that of normativity. Normativity is more related to legitimacy and more associated with science policy identified with science functioning and as a symbolic medium. The processes of normativisation will enjoy both centralised and decentralised legitimacy. In the context of a differentiated society rationality cannot be narrowed to normativity only. Rationality represents more reflexive practices and is transferred towards more procedural practices which take their inspiration from knowledge-based discourse – not always on the basis of integrity with generalised symbolic media.

This thought refers to a cognitive openness of communicative systems. Normativity of law is becoming responsive to new challenges posed by knowledge-based discourse. Because of our ever-changing environment, no stability to the creation of meanings is to be observed. Contradictory meanings and ways of understanding thus occur, as all are dictated by different rationalities and communicative interactions related to pluralistic procedural goals and requirements. The strong pluralism of procedures and meanings necessitates transparency, debate and democracy. Rationality is always bound towards a particular form of situation of meaning: a specific understanding entailing a unique situation as regards rationality, and hence situational normativity. It is worth highlighting the fact that, a postmodern context of increasing differentiation and fragmentation notwithstanding, the communicative levels of societies requiring coordination. Normativity is based on contradictory and reflexive rationalities which derive from what are also varied kinds of knowledge-based discourse. There is a reason

rooted in functional differentiation as to why law cannot reflect and represent science fully. This is why law and science policy are defined in this paper as external normativities (using Teubner's language as formal rationalities (Teubner 1983), which give guidelines but are subject to a contingency requirement preventing their fulfilment or coverage of all the meanings referred to, for instance as regards the differentiated social system of science (Sand 2014). Law and politics seek to provide functional codes by which meanings based on legal rationality may be understood. External normativity in the form of law and politics represents a contingency-based rationality. Even if the processes of reflexivity also affect law and politics, which have to deal with environmental complexity and differentiation logically, are not able to express a range of meanings they have to pay attention to. Areas regulated by law are diverse and mutually contradictory as regards the allocation of resources and rule orientation building. Teubner's point of view also seems to tend towards situationality (in this paper situational normativity) to highlight the so-called "micro political powers" which appear at the situational and decentralised levels and are reflected in knowledge-based discourse and on levels of interaction on which reflexivity is verbalised and articulated in the context of specific situations normed by their codes of semantics, programmes and practices in shaping understanding. These levels refer to tensions between macro, meso and micro dimensions of normativity and discursive rationality.

In line with Teubner's view, there is a need to go further in distinguishing various types of rationality. Legal rationality reflects the current tendencies present in society. The table below presents dimensions to legal rationality established by combining the following theories. The first is that of Nonet and Selznick (1978), which develops internal aspects of law, stressing growing visibility of law in purposiveness and participation that ensures greater responsiveness on the part of the law. The second theory used in this categorisation is that of Niklas Luhmann, who emphasises the demand of adequacy between law and society acknowledging the transition from societies that are more stratified towards current societies that are differentiated functionally (Luhmann 2007). In his view, the system of law should demonstrate an ability to self-reflect, in order to deal with the differentiation of society. The third theory touches upon Jürgen Habermas's moral-legal insights throughout the history. According to Habermas, contemporary society should be viewed as post-conventional, with this entailing an identification with participants' interests. All these processes are part of a rematerialisation of law that denotes its being affected by goal-oriented

Table 1. Types and Dimensions of Modern Legal Rationality

Dimensions	Formal	Substantive	Reflexive
Justification of law	The perfection of individualism and autonomy: establishment of spheres of activity for private actors	Collective regulation of economic and social activity and compensation for market inadequacies	Controlling self-regulation: the coordination of recursively determined forms of social cooperation
External Functions of law	Structural premises for the mobilisation and allocation of resources in a developed market society and for the legitimation of a political system	Instrumental modification of market-determined patterns and structures of behaviour	Structuring and restructuring systems for internal discourse and external coordination
Internal Structures of law	Rule-orientation: conceptually constructed rules applied through deductive logic	Purpose-orientation: purposive programmes of action implemented through regulations, standards and principles	Procedure-orientation: relationally oriented institutional structures and decision processes

Source: Teubner, G. (1983). Substantive and reflexive elements in modern law. Law & Society Review, 17 (2), p. 257.

tendencies inherent to particular spheres of system-society and capable of constraining the formal rationality described in the works of Max Weber.

A formal rational legal system creates and applies a body of universal rules, and formal rational law relies on a body of legal professionals who employ peculiarly legal reasoning to resolve specific conflicts. With the coming of the welfare and regulatory state, greater stress has been placed on substantively rational law, i.e., on law used as an instrument for purposive, goal-oriented intervention. Since substantively rational law is designed to achieve specific goals in concrete situations, it tends to be more general and open-ended, yet at the same time more particularistic than classical formal law (Teubner 1983: 240).

Besides experiencing differentiation in the area of law, science is also exposed to a variety of meanings and rationalities. In line with Luhmann and Teubner's contributions to the sociology of law, it is assumed in this paper that, within science it is possible to distinguish the same processes which ensure that science as a social system is differentiated functionally. The notion of normativisation introduced in the previous section tries to shed more light into the context of norms' creation. On the basis of the supplied categorisation of normativity as external, situational and internal, law and its processes of rematerialisation first and foremost affect the external and situational dimensions of normativity, which remain open cognitively and, where the set of norms is concerned, are eager to engage in self-reflection through extended discourse as to the internal normativity of science. In the case of science, it is possible to observe a transition towards purposiveness and participation – and more widely towards responsiveness, as well as a firmer focus on substantive (purpose-oriented) rationality (Sztompka 2007). Science has become differentiated in a more substantial manner that is giving rise to a debate over its functionality, factors achieving dominance in the building of meaning and ways of being understood. This differentiation in science, also taking account of an external audience thereto (as not only scientists are involved) is visible in science models that are tending towards greater inclusiveness and openness where the perception is concerned (Funtowicz and Ravetz 1993).

Progress towards science governance and challengesfaced

The complexity that normativity and rationality encompass has its consequences in the sphere of governance. It is assumed that policy, as an element of external normativity that is open normatively and cognitively, is making the mentioned transition from formal towards reflexively-based rationality, and that through this, governance is becoming exposed to a variety of meanings deriving from law, society and the knowledge-based discourse they engage in. The process of rematerialisation of law also affects governance, which is becoming oriented more substantively and purposively along with a plethora of discourse engaged in by many system participants of the *post-conventional* era, to use Habermas's term. With these aspects borne in mind, questions arise regarding democracy and relevant rationalities.

To begin with a definition, the concept of governance has been outlined in the following manner:

> Governance is characterized by intensive use of public-participation mechanisms for the coordination of collective action. Theory sees public participation as an essential attribute of governance or as the backbone of participatory governance, a special version of the governance paradigm. Each of these perspectives aims to involve citizens in public management processes and to expand the range of public mandates executed with stakeholder participation (…) Building effective governance mechanisms requires the overcoming of obstacles associated with: network design and organisation, coordination and communication of network activities, high network operating costs, insufficient competencies of partners, cultural and technological differences, the capacity of network participants to cooperate, negotiate and reach agreements, focus on shared network objectives, network operations being time-consuming and the evaluation of the outcomes being difficult (Zawicki 2015: 18 – 22).

Governance is being viewed as a hybrid form of coordination which consists of elements deriving

from hierarchical, market and network-based approaches. However, more particular modes of governance can be observed. Oliver Treib, Holger Bahr and Gerda Falkner distinguished four of these, based on the continuum from rigid to soft kinds of law, and in consequence binding and non-binding instruments used in governance. The first is "coercion mode", defined through a set of fixed standards and criteria, while the second is "voluntarism" – a non-traditional kind of governance that outlines goals without introducing any binding instruments in reaching them. The third is then "targeting", which also uses non-binding instruments, but with recommendations given being more detailed, and the fourth mode is "framework regulation", implying governance that applies binding instruments (regulations, directives, decisions, etc.) in line with a range of different options, goals and scenarios (Treib, Bahr and Falkner 2005).

Researchers mostly identify governance with networking and a more participatory approach. Within the area of so-called network governance, the strong emphasis is on quality as regards effectiveness of communication, goals being reached in concert, with cooperation and eagerness characterising efforts to improve functionality, and with best practices learned, trust offered, and greater flexibility and openness to change embraced. The organisational and administrative spheres of governance are still present in the debate, though participation and inclusivity are stressed. Networks rooted in organisations have a marked influence on attitudes, presented values and levels of participation (cf. Cuppen 2012, Gulbrandsen 2011, Sorensen and Torfing 2005).

Moreover, the concept of democracy is becoming more problematic, as research into rge implanting of a particular policy can indicate what has been conceptualised as "inconvenient democracy", where strategic networks and given meanings can make a difference as others are convinced on the legitimisation of a certain policy. It is within this kind of context that Nico Stehr discusses the notion of the "inconvenient minds" of a broad audience not fully engaged in scientific achievements, as well as "inconvenient social institutions" – that do not always respond appropriately to scientifically-based discourse (Stehr 2015, Brennan and Malpas 2010, Edelenbos, Schie and Gerrits 2010).

> The problem of network governance is not only to build network legitimacy both internally and externally, but also to address the potential tension between them. Network participants need to believe that collaboration with one another is beneficial. Thus, the value of interactions among potentially competing and diverse participants must be legitimized (…) it is also a key role of governance to develop and encourage interaction, making it commonplace and accepted (…) This means concern with the internal needs of the network and its participants, building collaboration among organizations that might not normally work together, resolving conflicts (Provan and Kenis 2008, p. 243).

In line with the above theoretical insights, it can be assumed that a turn towards more reflective endorsement can be observed where sources of normativisation are concerned. Following this view, network governance can be though to bring a more subjectively- and naturalistically-oriented perspective into the debate. That means sounding of the processes of subjectivisation, fragmentation and differentiation. However, network governance also yields attempts at solutions on the basis of participation, interaction and dialogue. Hence, a more flexible approach and soft law are becoming more attractive tools in the pursuit of governance. Law, being open normatively and cognitively (given its affiliation with the external normativity sphere), is characterisable in terms, not only of its more reflective rationality, but also its "transactive rationality", to highlight the emphasis on interactivity within a hybrid society (Kuruvilla and Dorstewitz 2010, Daviter 2015).

The challenges connected with governance, rationality and sources of normativisation problematise changes within science in a more explicit way. It this context, it is worth mentioning the tensions between the contradictory discourses perceiving science in terms of a more objective (classical) vision of science, as Science and Technology Studies (STS) does; or via the more-differentiated, subjectively-based approach demonstrated within the paradigm of Post-Normal Science (PNS) (Durant 2011, Bora 2010, Wesselink

and Hoppe 2011). What arises as a consequence is a question as to the set of meanings spread throughout knowledge-based discourse that conceptualises science in a certain way, drawing on the rationalities of a range of participants in network governance. The discursive meaning of science is thus tending to be more focused on a participation-based vision with functional, networking governance. Going further, the concept of "reflexive governance of knowledge"- arising out of the interactions between politics, society and science – can constitute a re-rationalisation and re-normativisation of the classical model of science, in the context of the post-modern/ post-normal differentiation of systems (Braun and Kropp 2010). To reach this point a postulated "medialisation of science" should be undertaken, to make science more open to non-scientists, and on the other hand to enhance wider audience participation (Carrier and Weingart 2009).

Conclusions: Open questions and areas under study

In line with the above observations, science can be understood in a variety of ways, depending on the paradigm applied. In this paper, the neo-functional perspective has been used to furnish concepts like normativisation, rationality and governance for a discussion concerning science and its conditioning. The paper illustrates how the debate may be enriched through the introduction of notions and specific aspects of rationality, along with the changing sources of normativisation that can represent challenges to science. Network governance problematises the quality of democracy, and reveals key points relating to effective communication and bridge-building (transactive rationality and dialogue) in a society that has promoted openness in the elaboration of decisions, not only by scientists. Undoubtedly, science governance as such has to be scrutinised more thoroughly if particular relations and specific patterns with local contexts of science functioning are to be noted.

There would seem to be a promising are for sociological exploration surrounding the relationship between science policy and what Stehr calls "inconvenient minds" and "inconvenient social institutions", and this is all the more so in a country like Poland, in which science may still find itself in a transition process by which an own set of meanings is normativised and rationalised, along with its own set of meanings, at the same time as values and standards in science arising from European Union policies are negotiated. On the one hand, postnormality and processes of re-materialisation of laws are moulding science into a more externally-oriented form, while on the other, postmodern changes within society offer the basis for a more-reflexive approach to the assessment of current policies and related discourses. Dilemmas regarding effective science policy can touch sources and foundations, different views on how a particular policy should be made, as well as contradictions between assumed goals and achieved effects. A question arises as to how far science can be fragmented and made diverse, in the sense of being democratised to ensure functionality? One of the answers neo-functional theory yields surrounds the assumption that law is unable to cover all schemes of meaning, because of contingency and the sheer complexity of the systems involved. The tension between democracy of differentiation and functionality cannot relate only to external normativity, given that situational and internal normativities also raise questions regarding additional conditions that can make it difficult to incorporate a certain set of meanings/ models/practices regarding the criteria of the normative closeness and cognitive openness of the core of science (internal normativity), as well as eagerness on the part of people and institutions to share certain modes of thinking and to participate in raising the level of knowledge in local contexts (situational normativity). Another problematic area addresses potential challenges between law (external normativity) and institutions (situational normativity), which can lead to disagreements between visions of policy, and shed more light on the lack of resources, inadequate/'inconvenient' ways of thinking, and the inability to cooperate within assumed networks of knowledge building, for instance. However, the such problems outlined require further study if in-depth analysis stemming from a case study involving science governance and practices of normativisation is to be achieved.

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Normatywizacja i procesy z nią związane z perspektywy neo-funkcjonalnej. W kierunku zarządzania nauką

Autorka analizuje pojęcie normatywności, które relatywnie rzadko pojawia się w literaturze z zakresu socjologii nauki. Koncepcję normatywności przedstawia w perspektywie neofunkcjonalnej, by głębiej wniknąć w powiązania omawianego zagadnienia z socjologią nauki i poddać nowe ścieżki analizy – w tym przypadku – w obrębie problemu rozumienia nauki. Naświetla relacje między typami normatywizacji a neofunkcjonalną teorią w socjologii, zwłaszcza dorobkiem Gunthera Teubnera. W ostatniej części artykułu autorka zwraca się w stronę zarządzania nauką, tematu wymagającego jednak dodatkowych studiów z uwzględnieniem szczegółowych kontekstów.

Słowa klucze: normatiwizacja, sytuacyjny normatywizm, nowy funkcjonalizm, socjologia nauki, zarządzanie nauką