Perfecting the Art of Managing Field Research Stations: Regimes of Justification

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Abstract. The paper discusses the development of network of field research stations at one of Russian Universities as an element of the strategy to increase its international visibility and recognition. The views of University leading scientists about the perspectives and the risks in the development of this network are analyzed through the conceptual models of ‘secluded research’ and ‘research in wild’[1]. Departing from the methodological approach of L. Boltanski and L. Thévenot in studying the ways human actors are justifying their actions (orders of worth), we claim that basic principles of ‘secluded research’ and ‘research in wild’ could be considered as justification principles that legitimize specific type of research management. By comparing the shortcomings and advantages of the two sets of principles, the paper provides insights for better realization of the importance of the efforts to develop University’ network of field research stations and offers a critical reflection on them (which by itself is a resource for the further works in that direction).

Introduction

During the last decade the management and research community of University was engaged in major effort in establishment, maintaining, and expanding a network of research stations for studying the environment and climate change in Siberia, and in developing this network as part of the all-Russian and global research community. Taking the lead, University in fact is facing the challenge to efficiently manage its relatively limited resources seeking cooperation and maintaining relationships with a large set of interested parties involved, ranging from the local communities and regional authorities, the federal government institutions and research funds, the business organization sand NGOs, and the international research communities and funding organizations. Minor part of these efforts is our attempt to explicitly study the views of leading scientists and Universities’ top management about the perspectives and the risks in the development of this network of research stations.¹ Our aim was to help

¹ The interviews have been carried out by one of us during the period between May and June 2018 at one of Russian Universities and the International Summer School for Students and Young Scientists (Earth sciences), July 2018, Universities’ research station. The target group were rector, vice-rectors, and pro-rectors of the University, field scientists and director of one of the research stations. There were 11 interviews carried out in total. The core set included four indicators – assessment of the importance of the field stations for the
University’ scientific community in the full realization of the importance of these efforts and at the same time to provide a critical reflection, which by itself is a resource for the further works in that direction.

The establishment and the development of University’ network of research stations is a remarkable effort and key element of a forward-looking strategy that will allow the university to preserve and further enhance its leading role in Russian and world science. It deserve special respect since traditionally such initiatives have been carried out by the Governments and central/federal research establishments such as Academies of Sciences, special government laboratories, etc., and with centrally allocated resources. This is true not only for Russia and the other countries in the former Soviet Union, Eastern Europe, China and others, but also to the world science as whole. The entire world scientific community today faces new challenges in the researches, in their funding, organization and relationships with larger society. In the section below we will briefly outline these changes through the models of “secluded research” and “research in wild”, developed by group of the French sociologists.

1. The evolutions of the dominant regimes of doing science

We can consider the changes in the dominant model (or “regime”) of doing science as transition from the regime of secluded research (le recherche confine) established back in late 18th and early 19th century to the regime of science in wild (or ‘plenary science’, ‘le recherché en plain air’ in search) that is gradually taken place since the last decades of the 20th century [2]. Put in brief, the secluded research presupposed sharp organizational division between science and society, where “…the laboratory is at the center of a research collective that organizes experimentations. The latter, through successive translations and reductions, replace the big world, the macrocosm, with the small world of the laboratory microcosm…” It organizes experimental work, fabricates inscriptions, and translates them into propositions. While doing this, it explores worlds made up of previously unknown entities. This investigation by trial and error, by more or less skillful adjustments and tinkering, develops in the midst of uncertainties which are gradually removed to bring new possible worlds into being inhabited by new entities, produced and domesticated in the laboratory” [2]. Then these new entities – now well-known and under the control of the scientists, are brought back in the larger society in the form of useful products, technologies, and procedures, via a processes known as applied research and R&D. This model made possible the second, third, fourth, etc., industrial revolutions. It also revolutionized agriculture, medicine, military, and eventually deeply transformed the modern societies. It legitimized the statue of scientists as experts involved in practically every sphere of public live and made them much needed as policy advisors.

Considered in the framework of the ‘secluded research’ model, the field work – either by regular expeditions, field experiments and trials, or carried out in the permanents field research stations – is just the beginning of the research whose core remains in the laboratory.\(^2\) Some scientific disciplines –

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\(^2\) The regime of secluded research stresses the importance of the controlled space of the laboratories and the principle possibility for theoretically modelling and reproducing in the laboratory a controlled way of the key characteristics of the studied phenomena and processes in nature. Data needed as initial condition and as testing the results of the laboratory modelling. Here the fieldwork that is only an initial stage of the expanding recursive process of secluded research. It includes going to the field, collecting data according to the preexisting theoretical hypothesis and methods, bringing data back for analysis in the secluded space of the laboratory, testing theory and modifying it if necessary, proving the reliability of methods of data collection and
such as chemistry, mechanists, solid state physics, molecular biology, etc., studied their objects in the laboratory only and do not need field work at all. That is why in his recently published article the British anthropologists Wenzel Geisslerand Ann Kelly claim that “…Field stations in the classic form are in themselves a thing of the past… [and] indeed risk falling out of scientific fashion… [3]. They are associated with a particular historical juncture, between the mid-19th century and the end of the 20th century, sandwiched between predecessors in expeditions and scientists on ships, and present-day successors in the form of remote sensing and global monitoring networks... Many field stations thus lie in ruins. But even those that continue to operate and grow... are continuously built, changed and rebuilt” [4].

It seems to us that most of the scientists we interviewed are not fully aware of the depth of the changes in the research practices going on, and most of them continue to consider research stations in the framework of ‘secluded research’ model of science. The new realities, however, are making their way through the practical work of the contemporary field research, as well as in the efforts to build, maintain, and develop the field stations themselves as specific research infrastructure – such as necessity to keep good relationships with local communities; to equip them with latest types of sensors, communication devices, etc. research equipment that allows rapid (pre)processing and transmitting of the research data to embed these stations in largest research network (in our case the world climate change monitoring network); to share research activities with other interested parties beyond science, and to open the disciplinary borders as much as possible [5] By doing current research not interdisciplinary but transdisciplinary this group of researchers is in fact entering the world of ‘science in wild’.

The ‘science in wild’ model emerges from the two key problems related with ‘secluded research’ model that are partly result of its prolonged dominance during the last two centuries. First, the humanity today is gradually becoming a geological force by itself, causing persistent changes in the Earth atmosphere, landscape, environment, etc. This is reflected in notion of Anthropocene that is gaining popularity as designation of the current period of Earth evolution [6]. Science and technologies are major factor in this change, and it is almost impossible to find ‘pristine nature’ anymore. In addition to what still remains unknown in the ‘nature’, the new human created entities (the plastics and the greenhouse gases are just two of the most discussed) are constantly ‘entering nature’, and they need to be studied. But this is a quite different endeavor than the ‘old’ field research from the previous centuries. The effects of human presence on Earth are constantly changing, hence the ‘state of nature’ (climate, environment, etc.) need to be constantly monitored and studied. It should be noted also, that if rare, in the secluded science there have already been entities and processes, that “cannot be brought in the laboratory’ and modeled in its microcosms, and that need real-world research, where the entire field became ‘laboratory’. Some authors considers this under the notion of ‘network societies’ as next transformation of modernity and where scientific research becomes increasingly important as key ingredients of “global informational capitalism” based on the processing of knowledge and information through new technologies [7].

Second, in the early 21st century the share of population with tertiary education (college and higher than college) in most developed countries reached 40% and more. According to OECD, with 54% of the population above age of 25 with university education Russia has one of the highest rates in the world (data for 2014). Having university education practically means that individuals have basic acquaintance with some scientific method and are potentially able to apply it and to understand scientific information, if in particular field. Scientific methods and laboratory practices are also largely used in industry, agriculture, medicine, public services, etc. Hence going to the field, scientists often find well educated people who understand their work, who are able to collaborate and to provide valuable help. Something more – there are scientific problems that cannot be solved without the inclusion of lay people in the process of data collection and data analysis (even by sharing computing power of their home analysis and modifying them if necessary, and returning to the field with new research questions using the same, modified or new methods of data collections and analysis, relevant to the new questions.
computers). Often lay people are the first to notice events and effects that are new for science, as shown by the recent case of cryovolcanism at Yamal peninsula,\(^3\) or the story of French association of people suffering from multiple sclerosis, which launched its privately funded research due to the lack of enough publicor (pharmaceutical) corporations funded research [8].

The model of “research in the wild” emphasizes that often laypersons are full-fledged researchers in their own right, but also that there are research problems whose solving cannot be reduced to laboratory research only and presupposes constant presence ‘in the wild’ – in the urban and industrial settings, in forests and agricultural fields, etc. On could say that if necessary, the science in wild is able to transform entire regions and communities into ‘data collection’ settings, and where local people often are involved in the very formulation of research problems, and in the modalities of application of knowledge. In the research in wild the field research stations – understood in a bit different way, play a crucial role – they are not just temporary shelters for scientists during their shorter of longer periods of data collection, but permanent research establishments at their own, with fewer analogies in the regime of secluded research such as the ‘old’ meteorological or seismographic stations. This is rather superficial analogy, however, since usually these ‘old’ stations have been collecting data on limited number of indicators that have little in common with the large ‘transdisciplinary’ profile of the emerging new type of field stations relevant to science in wild. A 2014 conclusion of US National Science Foundation report on field stations states that “…Field stations are ideal places to bring scholars and students from different disciplines together not just for a seminar or a lecture but for a weekend, a week, or even an entire field season to live and work together, to share ideas, and to benefit from the creative abrasion that results from the collision of ideas—particularly ideas from different disciplines” [3,9].

Before going to the analyses of the collected interviews, it is important to state that two regimes of science should not be considered as completely separate and hostile worlds, where the older model is being replaced by the newer one. Rather “…the research in the wild is perfectly compatible with secluded research and ready to collaborate with it. Complementarity, mutual enrichment, and not opposition. Connecting up the two forms of research enables the advantages of each to be combined, while erasing their respective weaknesses.” [2]. And it is worth to note that this openness and readiness for continuity is a yet another manifestation of the system approach.

2. **The regimes of research as justification principles**

   “…Scholars of valuation have developed concepts to analyze the different registers of worth that actors in a specific domain draw on to inform, orient, or justify their actions.” [10]

Policy studies of science often stress the capacity of human and institutional actors to assess the current state of affairs, to produce solid judgements and to design well-grounded strategies. Whenever they justified their decisions and actions, the key actors made explicit or implicit reference to principles and claims that were practically taken for granted, and often remain not fully articulated.\(^4\) This is true in every sphere of modern public and private life, and undoubtedly it is true in the field of science where choices in defining the (new) areas of research and investment in material infrastructure,

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\(^3\)The cryovolcanic effects have been first observed by educated lay persons who called the researchers - see [https://www.nature.com/articles/s41598-018-31858-9](https://www.nature.com/articles/s41598-018-31858-9).

\(^4\)The actors’ pronouncements “…are often incomplete, fragmentary, even incoherent, but that does not mean that they are unintelligible or self-regarding. If moral arguments must be universal in order to be legitimate… and if we suppose that actors are aware of the difference between moral and self-interested arguments, it is reasonable to extrapolate from what is intended by empirical fragments, to help clarify what underlies a particular position, even if the actors themselves are only partially or intuitively aware of all the nuances of the justifications they are setting out in a particular situation.” [12]
equipment, and human resources influence the life of institutions, regions and even entire nations for decades ahead.

The conceptual frame of “regimes of worth” is relevant here, since unlike the sociological notion of value guiding action, the notion of worth “...presupposes a reference to an order whose just character can be revealed: a justifiable order” [1]. The notions of orders of worth and regimes of justification allows to focus on the limitations that steered how individual and institutional actors in science, and on the ways they coordinate their actions and relationships both among themselves and with material world [1]. There are two basic modes in taking decision: ‘regime of peace’ and ‘regime of dispute’, which can be further specified by introducing an additional distinction “according to whether relations under these regimes invoke principles of equivalence or not” [11]. In the regime of peace we have situations where a principle of equivalence is maintained, or situations where relationships are non-equivalent. This is the case when the regime of dispute turns into violent action where a particular decision is simply imposed. According to Boltanski the transition from a regime of justice based on the principle of equivalence to the regime of violence is closely related to the degree of urgency in a given situation.5 Interestingly enough -- and this is one of the authors’ important contributions, it is possible to maintain the principle of equivalence in the regime of dispute when the decision is imposed in a peaceful way based on some general principles (worth) that are acceptable to all.

It is important also that the orders of worth are not attached to groups or persons, but to the situations in which persons find themselves. It is clear from the analysis of the judgment of the leading scientists and experts about the development of the network of research stations for monitoring global environment and climate change in Siberia (and “A” research station in particular) that the actors involved resort to the non-violent regime of dispute and related orders of worth that allowed them to justify peacefully certain decisions based on a set of ‘universal’, transcending concrete situations, principles. Yet there are some particular situations (if rare), where the actions can be considered as violent, as implementation of force – for example the unilateral decision by one of the organizations to place a fence in the middle of the previously mutually used territory without consulting the affected partners, or the cases of harming of natural environment and stealing research station’s property by some members of local communities (this justified the need for regular guards at the stations).

Setting the non-violent regime of dispute in the core of their analysis, initially Boltanski and Thévenot distinguished six orders of worth,6 each of which allows persons and institutions to justify their actions in particular situations and settle conflicts in a nonviolent way, thus defining specific ‘worlds’ of particular types of actions. An actor may invoke one or more of these orders of worth in any given situation, without being firmly tied to any. In many situations, conflict may exist between actors, invoking potential tensions between different orders of worth.

Our initial idea was to look at our interviewees through the frame of the orders of worth with an attempt to unveil their implicit adherence to some of these orders when they were justifying their views and positions. However, after reading the transcribed texts, it came to us that it might be quite interesting to consider the two regimes of doing science outlined above as specific orders of worth by itself, i.e. as two sets of ‘universal’ principles that explicitly or implicitly help the actors and institutions to justify their decisions and their actions. The initial tensions around the statute of one of the field research stations (“A”) are especially revealing here.

5 “...The shift to violence might be understood as a reduction in the time delays that are acceptable in interactions either with people or with things... For a force does not wait, does not reflect, does not deliberate, does not withdraw to talk things over, but applies itself to whatever applies itself to it in turn and resists [italics ours] [11].

6 In their book published in French in 1991 and translated in 2006 in English the worlds based on particular orders of worth were named world of inspiration, domestic world, world of fame, civic world, market world, and industrial world [1]. Later they added a seventh, the ‘green’ world, based on a principle of environmental worth, pointing at some inherent difficulties in this definition compared with the earlier orders of worth – such as multiple ways in which the ‘green worth’ appears, the related difficulties in achieving equivalents, etc. [13,14].
Initially managed by one of the Faculties and used mostly for researches in geology, hydrology and glaciology of Alpine Mountains and students' field practices, the station was typical for ‘excluded science’ model. However, the difficult years in the last decade of the previous and early this century, together with several key events (the decline of glaciological school at the Faculty after the death of its founder, the earthquake in 2003, etc.) they significantly reduced the ability of the Faculty to maintain and develop the material infrastructure, and with this the research and educational work at the station. However, the university leadership from late 1990s on, together with several leading scientists in the interdisciplinary field of environmental and climate research realized the potential of the station. They considered the changes not just as a better way to develop university research, but also to attract additional financial and other resources for its maintenance and development, and to gain national and international prestige for the university. Eventually they won and the station obtained new statute as Center for Complex Usage (CCU) at University. It was a turning point in the long period of existence of the station. Due to its geographical location: the inaccessibility and harsh climate of the highlands, the maintenance of the infrastructure of such a station requires enormous resources, while the Faculty and even the University do not have such resources. In our interviews all key actors from the university leadership spoke about this. In fact this was a situation that is often described in the literature as typical for the management of Arctic stations. Transformed into CCU, the station has received additional funding for infrastructure upgrades. However, the status of CCU assigned to the station did not change completely the older affiliations. Thus the station now station emerged with two control centers – the ‘old’ Faculty it initially belonged to, and the CCU. For a long period after the establishment of CCU there were not conflict between two ‘control centers’ coexisted peacefully. However, over time, and mainly due to the efforts of CCU, the station actively developed and begun to attract also of tourists, climbers, and other interested groups. Later the station was included in an expanding network of research stations serving multiple interests - not only of the University's scientific and educational community, but also of the multitude of potential stakeholders in the region, Russian Federation and abroad.

However, the ‘old’ Faculty continues to consider it as its own “Geographical Station”, keeping a station director at payroll and even consciously increasing the narrowly defined research and educational work there. The peculiar location and climate of the station we mentioned above make it open to visitors only 3 months a year. Thus after the CCU ameliorated infrastructure and improved the overall condition of the station and it gained popularity again, instead of few small groups of students and researchers as it was before, now the ‘old’ Faculty suddenly increased their number to hundred students annually to undergo field practice. As we know, the educational process is a priority for any university, but this increased number of student did not brought any additional resources to maintain the infrastructure of the station – all remained at the expenses of CCU! Also, Faculty researchers continued to consider the station as ‘our station’, often at the expense of the other groups now regularly visiting the station – researchers from other TSU departments, from other Russian universities, and from abroad, ‘VIP people’ (key figures from Government and regional administration, university business partners), elite sport groups, etc. It is important to note, that from CCU point of view these visitors have great potential both for raising the University’s international ratings (publications in highly rated journals, prestigious international projects) and resource for supporting of the development of station infrastructure.

We claim that the root of this latent, but persistent tensions are not just the lack of ‘good will’ and selfishness of Faculty’ community, but that these tensions are rather related with to different visions of doing science, and which can be considered as local versions of “excluded research” and ‘research in wild’ regimes outline above. The table below outlines the key axes these two visions could be juxtaposed. We filled in the cells of the table based on the statements of our interviewees, summarizing them for each of the key legitimation principles of doing science (both in secluded and plenary mode of research), applied to disciplinary orientation, internal aspects of research process (defining research problem, funding, equipment), and application and visibility of research.
Table 1. Justifying the necessity to maintain and develop University’ field research stations

| Key principle | “Geographical Station” (Secluded research) | “Center for Complex Usage” (Research in wild) |
|---------------|------------------------------------------|-----------------------------------------------|
| 1. 1. Disciplinarity | Mono or interdisciplinary | Inter- or trans-disciplinary |
| 1.2. Readiness for continuity and transfer of knowledge and skills. Degree of openness & contact with stakeholders | Closed system. The rejection of a different approach and vision, in particular the rejection of a transdisciplinary approach | The openness and readiness for dialogue. Regular contact with all groups of stakeholders, incl. local communities. Work with authorities, with university management and regional leaders. The desire to unite with the leadership of the faculty to strengthen positions. |
| 2.1. Who formulates research problem? | Faculty’ research community, based on proper scientific reasoning or ‘on public demand’ for expertise | Formulated within the larger ‘collective’/network of university researchers with their close partners from other research centers in Russia and abroad; often key stakeholders – large corporations, regional authorities and others are directly involved; University’ researchers act as coordinators and ‘knowledge brokers’ |
| 2.2. Financing of research | Internal sources dominant (from the university budget; research grants) | Focus on large trans-disciplinary international research projects and networks; spreading the costs through stakeholders |
| 2.3. Who is authorized to get finding (grants) | Research institutions only | Research intuitions, in collaboration with bodies and organization beyond science |
| 2.4. Who has access to research equipment | Exclusive access to scientists | Scientists plus members of external communities; sharing and delegation of pieces of equipment based on common knowledge and skills |
| 3.1. Internationalization | Within narrow disciplinary scientific communities | Within larger set of research, public, business and not-for-profit organizations Internationalization directly linked to the efforts to increase the status and prestige of the University |
Solid facts; from science to society; once out of sciences, results are not contested

Research results tested and contested in the large international research community and against the local knowledge (in industry, agriculture, local communities)

Focused on scientific periodicals

Scientific periodicals, but also seeking larger audience - social networks, public media, open access

Work on the image is perceived as a source of expenditure, and accordingly is not carried out. The “Geographic Station” page on the University’s website is blank.

Active work on the image (interviews with management and visitors, film preparation, numerous presentations of the station and all types of projects conducted on it, a lot of information on the Internet, an informative site). Investing resources in the work on the image. Principle - minimal investment, big return

Linear, short-term

Search for Better Intervention. An attempt to change the situation for the better for all stakeholders

After filling in the table we found statements, however, that are not directly related to key principles outlined, but rather fall under other orders of worth as outlined by Boltanski and Thévenot. The limited space of the paper does not allow us to go into details here. Instead, we provide two brief remarks that point to the possibility of further analysis in that direction.

One of the vise-rectors clearly referred to market order of worth, if in a negative way – research activity, he said, “… it is certainly not a commercial or profitable activity, it is not aimed at making a profit. This is a research activity, but [nevertheless] there are interested parties in the research.” With this he argued his position that in maintaining and developing the set of field research stations, University should seek interested third parties and collaborated with them just like business partners collaborate based on common economic interest.

Another interesting references to orders of worth concerns the relationships with so-called ‘VIP’ or ‘status’ persons. One of the interviewed asked: “Status people, whom we bring to the station… are ready to invest, but they want to be there alone without “outsiders”. How to regulate this delicate issues?” The answer we found in the comments of another interviewee: “Doing science and learning process are top priorities. But the reception of status people who are in the zone of interests of the rector should be streamlined and thought out - think over the charter of the base, a certain document. It should be sent before the arrival of people at the base”. In our view this issue is a clear manifestation of the reasoning based on domestic regime of worth, i.e. “hierarchical positions in a chain of personal dependencies”. In a formula of subordination established on a domestic model, the political bond among beings is conceived as a generalization of the bond of generation combining tradition and proximity. This might be considered a trace remaining from the communist or even distant imperial past, where “… the party and state were considered in paternalistic terms… and where all the problems were solved through the centers of power” [15]. Yet in the specific conditions of contemporary modern societies, these hierarchies, acting beyond the market and civic regimes of worth – i.e. maintaining good relationships with “external and internal VIP-persons” and having their goodwill, is very im-
portant resource in solving various types of problems related with the functioning of the university and development of its research infrastructure in particular.

Conclusion
In the present paper we discussed the difficult and timely problems of maintaining the field research stations inherited from the XX-th century modern science and by transforming them, adapt to the changing status of science in society and the contemporary research needs in the age of Anthropocene. We approached this problem by analyzing the development of network of field research stations at one of Russian Universities that took place during the last two decades, being closely related with University’s strategy to increase its international visibility and recognition. The members of several University management teams have been interviewed, together with leading scientists and field stations managers. We analyzed their views on perspectives and the risks in the development of the field research stations network this network through the conceptual models of ‘secluded research’ and ‘research in wild’ [2], which have been interpreted, however, as specific ‘regimes of worth’ [1], justifying the an important part of the decisions in the research management, carried out by the interested parties involved. This does not preclude the relevance of other established regimes of worth, the market and the domestic ones being especially relevant. The results of the analysis have been summarized in defining two opposite views on field research stations our interviewee explicitly or implicitly share. We named these view “Geographical Station” and “Center for Complex Usage” and outlined them according the legitimation principles way representatives of each view base their judgments. By comparing the shortcomings and advantages of the two sets of legitimation principles, the paper provides insights for better realization of the importance of the efforts to develop University’ network of field research stations and offers a critical reflection on them (which by itself is a resource for the further works in that direction).

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