‘Contextualized knowledge’. Insights from the Organizational Memory of a Research Institute.

David Barberá Tomás, Instituto de Gestión de la Innovación y del Conocimiento-INGENIO, Universidad Politécnica de Valencia, Spain, jobarto@ingenio.upv.es

Ernesto de los Reyes López, Instituto de Gestión de la Innovación y del Conocimiento-INGENIO, Universidad Politécnica de Valencia, Spain

Álvaro Page del Pozo, Biomechanics Institute of Valencia-IBV, Spain

Javier Sánchez Lacuesta, Biomechanics Institute of Valencia-IBV, Spain

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**Abstract:** ‘Contextualization’ is a central topic in Mode-2, a new form of knowledge production. It has recently argued that there are three criteria which mark how contextualization happens, and also three forms of contextualization that can be observed. This article investigates criteria and form in the Organizational Memory (KNEXT) of a Research Institute (IBV). Two main conclusions can be drawn: first, depending on the object of study, some criteria are more useful than others; in our case, located in a intraorganizational level, the second criterion -more concern with what we have called a strictly ‘production analysis’- has more explanatory power. Finally, an evolutionary perspective on knowledge production, based on the appearing of Mode-2 objects in the KNEXT/IBV case, is outlined.
1. Introduction

Mode 2 is a term that appears in the middle of the last decade and tries to describe the specific characteristics of an important part of the contemporary production of knowledge and research processes, in contrast to Mode 1, which makes reference to the ancient paradigm of the scientific discovery. While in Mode 1 the generation of knowledge takes place in the autonomous context of the theoretical and experimental sciences, to later “apply” them in different contexts, all the activities of Mode 2 (description of problems, resolution methodologies, dissemination of results, use definitions…) take place in the sole and comprehensive “context of application”1

But the term “context of application” led to misunderstandings with the already known concept of “applied research”, by which the authors, in their following works2, developed their argument with a deeper analysis of different criteria of “contextualization” of knowledge and the different forms which this phenomenon may adopt. The aim of this article is to characterize the process of reutilization of knowledge in a Research Institute through these criteria and to determine which type of contextualization takes place.

2. The IBV/KNEXT case

The Instituto de Biomecánica de Valencia (Biomechanics Institute of Valencia, IBV) is a research institute, set up by the Polytechnic University of Valencia (UPV) and the Valencia Institute of Small and Medium Sized Enterprises (IMPIVA), ‘which purpose is to promote and undertake scientific research, technological development, technical advice and training in the area of Biomechanics. (...) Due to the diversity of scopes in which biomechanics are applied, the organization structure of the IBV is composed of three research teams in Medicine, Sports and Occupational Biomechanics’. The activity of the IBV ‘is based on research areas that take shape through its R+D projects, which are directed to different areas of social and economic interest. To develop such projects, it works in close collaboration with all the agents that intervene in each one of these areas. Main clients and agents are: Companies, Business Associations and Groups, Professional Colleges, Users, User Associations, Public Administrations and other R+D Centres’3. The IBV has taken part in more than 200 R+D projects, and the number of entities involved in these projects in one way or another rises over 450.4

During 2003 IBV set KNEXT (advised by the Instituto de la Gestión del Conocimiento y la Innovación (INGENIO)) in the frame of a project financed by the Polytechnic University of Valencia (UPV), as a computer assisted organizational memory (OM). OM are cognitive and technological artefacts which main purpose is the storing and reutilization of the organization knowledge base, in order to use it in new tasks5. Among

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3 http://www.ibv.org
the technological ones, which we are going to concrete here, we find the ‘computer assisted organizational memories’. The computer assisted organizational memory that was employed in the case we are going to analyse is the KNEXT (Knowledge Next), a web based software developed by the Universidad Tecnológica del Centro de Venezuela (UNITEC). KNEXT is a “very valuable resource for the standardization and consolidation of a structure for the knowledge base of any organization, as well as in a common mechanism of transference of knowledge”. KNEXT groups the documents in ‘knowledge cells’: each cell is a delimited and autonomous block of information; this means that has sense in itself without needing another cell. In a knowledge cell it must be placed all the necessary to apprehend what the title and the abstract of the cell shows. The interaction with the knowledge cells responds to two main objectives: the management and the search of information.

2.1. The management of information

By management of a ‘knowledge cell’ it is referred the workflow process executed through the software and thus sequenced in four stages:

1. Proposal: the proposer suggests the creation of a cell, its title, its resume and a list of co-authors. The KNEXT administrator decides about the interest of accepting the proposal. In case of affirmative reply, he entitles a person responsible for the cell and authorizes the advance to the new stage.

2. Edition: the responsible elaborates a definitive list of co-authors (which may or may not include the proposer) and incorporates the descriptive filters which may think to be adequate. The responsible and the co-authors introduce the contents in the cell until the responsible considers that it is ready to go through the next stage.

3. Publication: the information introduced in the cell is made public for the users.

4. Maintenance: the responsible decides if the information in the cell must be brought to date. In this case, the cell may go back to the Edition stage.

Besides the user (who does not take part in the decisions belonging to the management of information) there are in the workflow process four other roles subject to different degrees of restriction:

Proposer: any IBV researcher may play this role without any kind of restriction.

KNEXT Administrator: it is a fixed role inside the IBV organizational structure.

Responsible: it is appointed by the KNEXT administrator among the researchers proficient in knowledge associated with every cell. The KNEXT administrator may support her/his decision in other actors (i.e. Head of Teams), but this possibility is not formally included in the whole process.

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2.2 The search of information

In the search of information, the role adopted in the interaction with the knowledge cells defines the user. Any researcher of the IBV may adopt this role without any kind of restriction. The tasks of the user are to select the appropriate descriptive filters in the search engine in order to make her/his search easier. These descriptive filters were generated during the process of introduction of software: in the stages of characterization of information, the IBV made a survey among its researchers to set the search engine. The researchers chose a mixed search engine that allowed making free searches by words but that included the possibility of making structured searches of documents, adding descriptive filters to the free search. The structured search was organized according to a “context characterization”, because “a list of descriptive filters by subjects would soon be outdated, thus, we have chosen general kinds of knowledge associated to phases of our job”\footnote{KNEXT/IBV working paper}. The researchers were asked to make a list of context descriptors for each of the scientific knowledge cells; after reviewing the answers of the researchers, the following list of context descriptors was made\footnote{KNEXT/IBV working paper}:

1. Ideas of projects not developed.
2. Proposals: proposals of projects presented to customers.
3. R&D equipment handbooks.
4. Information about scientific software.
5. Bibliography information: bibliographic reviews made in the IBV, resumes of articles, etc.
7. Reports database. Database with results of studies and projects, internal and external.
8. Results of projects. Results of projects delivered to customers or entities.
10. Dissemination materials and technical and scientific promotion. Articles, papers, conferences, monographs, etc.

3. The contextualization of knowledge.

3.1 The three criteria of contextualization

The ‘contextualization’ is one of the Mode-2 essential characteristics in the production of knowledge. Nowotny et al. (op. cit) have developed in their last book a detailed analysis of this phenomenon. There we can found three criteria for contextualization to happen. First, the scientific community has evolved from a more ‘segregated’ model of interaction with society to a more ‘integrated’ with its social context. These models of social forms of co-operation and competition of a collective proceed from their ‘behavioural beliefs’: that is to say, from their dispositions before actions that will be
taken by individuals in situations which (in a game-theoretical perspective) will never occur. The groups articulated around a collectivist beliefs and behaviours tend to be ‘segregated’ from other social groups or individuals, as there is a high level of cooperation among the members of the group and a highly homogeneous system of values and norms that binds members together. In contrast, in societies in which the individualistic behavioural beliefs are dominant, these tend to be related in a more ‘integrated’ way, allowing an inter-group collaboration (and competition) with a wider scheme. In the Mode-2 society, two forces compel, almost violently, the scientific community towards a more integrated interaction with the rest of social groups. On the one hand, the supply and demand of scientific knowledge has spread greatly due to the generalization of university education, fact that has scattered the know-how of scientific activity through different and very heterogeneous social ranks; at the same time, the demand has generalized due to its proven capacity to resolve different kinds of problems. On the other hand, the action of reflexivity, the discourse as maker of social realities – the hackneyed speeches about the importance of innovation and knowledge in the wealth creation, and in the competitiveness of a global market have modified, in fact, the system of beliefs of the scientific community, and have restructured its institutions and its funding sources.

The second criterion alludes to the mechanism of production of contextualized knowledge, through an evolutionary perspective. The uncertainty inherent to Mode-2 society entails a greater degree of variation and competition, not only in the search of funding sources, but also in the definition of aims and in the research methodologies. While in the Mode-1 the solving problems configurations were top-down designed and well established, in Mode-2 the complexity and multiplicity of the socio-economic aims also result in many different potential ways to undertake the research, that, at the same time, are restricted by the constraints that the specific context of the problem establishes; the scientific personal must carry out a process of selection (and, frequently, of iteration) depending on the success of past proposals that have adapted to the constriction of the particular context and that provide a background of ‘promising’ strategies. The constraints act as filters of evolutionary selection which shape the potential researching ways generated by the multiplicity of the Mode-2 society. These selective mechanisms materialize as the researching process advances – they are not a priori determined by external institutions (as it occurs with the prototypical research strategies in Mode-1) but elaborated en route when the production of knowledge finds in its way context constraints. This fact does not mean that the quality control mechanisms disappear – those very mechanisms do internalize in the auto-organizational process of the research, instead of taking place in external institutions.

The third and last criterion refers to the place of people in the Mode-2 produced knowledge: either in their factual incorporation to the processes of production, funding and evaluation of knowledge or in their conceptualization as research subjects at different levels. Depending on the presence or absence of these three criteria, different forms of contextualization may be characterized. Thus, different cases of “weak contextualization” and “strong contextualization” were analysed to bring empirical clarity to the concept of “contextualized” or “context-sensitive” knowledge. In the cases of “weak contextualization” (Particle Physics and National R&D programmes), the signals proceeding from society are weak and are thus channelled through institutional

9 Nowotny et al. Re-thinking Science, pp. 121-142.
ways, top-down designed. In the cases of ‘strong contextualization’ (CA/T Project and French research in muscular dystrophy) the scientific personnel had the chance and, above all, were willing to interact with other sectors of society: this interaction could materialize in new forms of organization (in which no single person or agency were in charge, and management was exercised in a more participatory way), in the configuration of the research agendas and methodologies, or in the search of new funding sources; all these procedures being executed through a bottom-up structured collaboration, in which the rest of sectors of society did participate actively in the decision-making process.

3.2 Contextualization ‘in the middle range’

However, the great casuistry regarding the uncertainty and the complexity associated to Mode-2 society is incompatible with rigid patterns of contextualization of knowledge. That is the reason why the authors improved their theoretical development treating the ‘contextualization in middle-range’ (whose variety is more keenly representative of the multiplicity of situations in which the negotiation between science and society give rise to contextualized knowledge), describing two phenomena 10 which provide and indicate the apparition of contextualized knowledge. One of these phenomena is the ‘transaction spaces’, where the exchanges produced go beyond the disciplinary and institutional limits established in Mode-1. The ‘transaction spaces’ proceed from the ‘trading zones’ described by Peter Galison in analysing the exchange between different communities of scientific and technical personnel during the evolution of nuclear physics along the 20th century. The generalization in the exchange of instrument technology, experimental design procedures and simulation analysis between different disciplines has caused these zones to spread in a great deal of fields, opening up new channels of communication of concepts, ideas and results which, in the end, generate new techniques and procedures. In these ‘transaction spaces’, new lines of communication between the participants are established, in order to decide which items might be exchanged, that is to say, which type of interaction prevails over the context constraints of the research. But these new lines of communication do not imply an agreement about the meaning of the permuted objects – the only condition is that they must be valuable or pertinent for the actors in the exchange, who are the ones to decide what kind of use they give to their acquisitions.

Mode-2 objects are the other phenomena associated to the contextualized knowledge. The Mode-2 objects do not explain the process of contextualization but are, by themselves, one of its results – although these processes may not necessarily end up in the creation of one of these objects, its mere presence indicates the influence of context in the production of knowledge. In fact, they are the physical entities in which the negotiation between scientific potential and constraints of the context materializes, which finally leads to contextualized knowledge. A Mode-2 object may be a type of organization, as it occurs in the Human Genome Mapping Project, in which the research could only be carried out when a new method of management was able to cover the diverging interests of the multiple actors implied (and essential) in the project. The interaction of the context with the industry has been traditionally conceived in terms of market signals. However, the society imposes many other constraints to the industry

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10 Nowotny et al. Rethinking Science, pp. 154.
activity – environmental, quality or safety demands, often articulated through organizations of consumers or other groups of interest without any kind of relation with the government. The design configurations are socio-technical devices that result from the interaction between the specific knowledge of the organization and these context constraints: the path-dependent character of the organizational capacities (as stated by Nelson and Winter\(^\text{11}\)) emphasizes even more the evolutionary and, at the same time, heuristic character of these Mode-2 objects, that as entities produced by the negotiation context-industry, will guide partially or totally the production of a particular firm or even an industry sector.

4. Discussion

In this section, we will study the process of knowledge production in a Research Institute (IBV) through the mechanisms of contextualization previously exposed. The type of process that we pretend to analyse will be focused in a more ‘micro’ level than the examples provided by Nowotny et al. Models of organization including many social sectors will not be revised, neither will be new management nor funding strategies; our approach to contextualization is based on the process of reutilization of knowledge carried out by any institute researcher in the elaboration of his knowledge production. We can analyse this process because is explicitly represented in KNEXT, a computer assisted organizational memory.

4.1 The criteria of contextualization in KNEXT/IBV case

In a macro level, the IBV as an institution incorporates the different criteria of contextualization already detailed. The shift towards a more integrated model of articulation with society is drawn up (in a classic reflexivity operation) in the different institutional discourses issued in the IBV journal (‘Revista de Biomecánica’) or in its web page, where it is emphasized the collaboration of the Institute with the different agents: “companies, Business Associations and Groups, Professional Colleges, Users, User Associations...”. Historically, the IBV has opened up the scope of its activities from “basic biomechanics” (the study of the mechanic behavior of the human locomotive system) to other more user-oriented fields, as Ergonomics or Rehab Techniques, in an “integration” movement which involves a higher number of social sectors in the knowledge produced by the Institute. These disciplines are backed up in terms such as “usability” (that from its formulation implies the consideration of “other” apart from science and technology), frequently used by the researchers of IBV, that indicates the presence of what could be considered a socially sensitive epistemology, where people concerns and desires (as the third criterion of contextualization expresses) are conceptualized as an object of the research.

However, in the intra-organizational level in which we stand, the more relevant contextualization criterion is the one that describes the evolutionary process of negotiation between the knowledge potential and the context constraints, since it alludes more strictly to the production mechanisms of contextualized knowledge. In the case of reutilization of knowledge in KNEXT/IBV, this process is represented by the

descriptive filters classifying the knowledge cells, especially in the filters referring to projects: 1. Ideas of projects not developed; 2. Proposals: proposals of projects presented to customers; 7. Reports database. Database with results of studies and projects, internal and external; 9. Results of projects. Results of projects delivered to customers or entities. In every case, when a researcher of any group of the IBV uses materials in the elaboration of his knowledge production (from the very “beginning” of the chain of the research activity described by Mode 1), employs a type of knowledge (the project) precipitated in contact with the social atmosphere; this precipitate adopts different forms depending on the success of the negotiation between the potential and the constraints: ideas not developed, proposals or results.

The choice of the project as a form of crystallization of knowledge is in itself a sign of the interaction with the context. The contemporary idea of ‘project’ appears after World War II, linked to the great military programs of the US administration. More exactly, it was with the development of the Polaris submarine (which implied the coordination of more than 9,000 companies) when the new tools of the Project Management (which were later to be used in different fields) appeared. Subsequently, the project was to be conceived as a tool able to face up the complexity and uncertainty of the current economic environment, which demands a flexibility that the bureaucratic organization does not usually enjoy. This flexibility lies implicit in the reasons which led to the ‘characterization of context’ of the information search of the KNEXT/IBV, since a list of descriptive filters by ‘subjects’ will be soon updated. The choice of the term ‘context’ (which was not made by personnel familiarized with Mode-2 semantics) indicates that the production of new knowledge, since it must employ necessarily past knowledge for its elaboration, it is always guided by the interaction criteria with the environment as a result of past research experiences. It is not unreasonable to think that, in a certain measure, any scientific production has used and uses contextualized knowledge as a source for the research. Maybe what has more explicative power in this case is the fact that, as there are no discipline filters for knowledge description, none of the original nucleus of the scientific knowledge stays autonomous. Thus, new production will be always based on knowledge described in terms of success of the negotiation of the knowledge potential with the contextual constraints, expressed in form of ideas, proposals or result of the projects.

On the other hand, as it has already been reviewed in the last section, this negotiation is not beyond any kind of control. However, contrary to what occurs in the prototypical research in Mode-1, the control has been internalized in the auto-organized process of the research. On a intra-organizational level and in the case of KNEXT/IBV, this internalization responds to the quality control mechanisms that act in each of the stages of the workflow of the information management: these mechanisms are not established a priori, but have been included in the very process of representation of knowledge, being even independent from the hierarchic structure of the Institute. There is only one role (the KNEXT administrator) that coincides with one of the official figures of this structure; the rest (proposer, responsible and co-authors) are assigned during the process of creation of the cell, and not before, and based on expertise criteria then elaborated, depending on the type of knowledge ready to be published.

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We have already seen that the process of reutilization of KNEXT/IBV knowledge (and, in some aspects, the IBV as institution) fulfils the contextualization criteria of the knowledge production stated by Nowotny et al. as characteristics of Mode-2. Still it is unresolved to which extent of contextualization (weak, strong or ‘middle range’) this process is materialized. The intensity of contextualization depends, among other factors, on the ‘desire’ (not on the adaptation, or on the answer to an external stimulus as, for example, a determined politics about science) of the scientific community to negotiate with the contextual constraints the production of the knowledge potential in which they develop their work; also, on the effective degree of implication of other social sectors in this negotiation: if this implication is either conducted through institutions to a greater or lesser extent representative of these sectors (but not constituted by its members) or through different modes of statistic aggregation, then we cannot speak of a ‘strong contextualization’.

The contextualization in the KNEXT/IBV becomes effective through two phenomena: the process of knowledge reutilization channelled through selection filters representing the evolutionary constraints of the environment; and through the auto-organization of this reutilization process according to its own quality control criteria, alien to the organizational structure of the Institute. However, in these two phenomena only Institute researchers may participate; in excluding the direct participation of other social groups in the reutilization process, the contextualization may be located in the ‘middle range’, characterized by the presence of ‘transaction spaces’ and ‘Mode-2 objects’.

These two concepts must be reviewed, though. The ‘transaction space’ must observe two conditions of existence: that the exchanged objects must be susceptible of a veritable ‘transaction’, so they have to be liberated of any normative “use value”, since the use must be given by each of the participants who ‘take possession’ of the object; and that the exchange rules must be established exclusively by these participants. In this way it is assured the possibility of a contextualized and inter (and in some case, trans) disciplinary exchange, subjected in any other way to the ‘incommensurable’ meanings (in the terminology of T.S. Khun) provided by a specific scientific community, that limit its possible uses (in the KNEXT/IBV, its possible reutilization in the production of new knowledge) to the frames of a discipline; and it is also assured that the exchange rules do respond to this trans-disciplinary spirit, in order to escape from the solving-problem methodologies top-down design.

In the KNEXT/IBV, the researchers of different biomechanic disciplines (medical, sports and occupational) find a space in which they may exchange tools and technologies, including the following descriptive filters: 3. **R&D equipment handbooks**, 4. **Information about scientific software** and 6. **R&D methodologies**. On regarding this subject, the KNEXT/IBV is a ‘transaction space’, since it is conceived for methodologies and tools to trespass the disciplinary limits in which they have been conceived and be employed in many other fields. That is precisely why the filters referring to ‘results, ideas or project proposals’ provide these knowledge cells with an identical character of object susceptible of being transacted, since they are not being used on their original manner: a project is an already ‘produced’ knowledge, what it means that is it beyond the production process; however, the researchers that
‘appropriate’ of these knowledge cells belonging to the KNEXT/IBV ‘transaction space’ may be employed as resources in any of the stages of knowledge production.

Apart from these describing references to methodologies and projects, the KNEXT/IBV also includes other references that cover the most usual activities of the scientific production Mode-1: 5. Bibliography information: bibliographic reviews made in the IBV, resumes of articles, etc; 9. Teaching materials. Texts, notes and other materials; and 10. Dissemination materials and technical and scientific promotion. Articles, papers, conferences, monographs, etc. The IBV, as a Research Institute, it is involved in what Guldbrandsen and Langfeldt has recently described as a two-way process, and that also could be characterized as ‘Mode-2 dilemma’: while the results of the Research Institute activities must be more ‘user-oriented’ than ever to meet the funding requirements of the policy-makers, the evaluation of these results is carried out through peer-certification and other procedures strongly based on academic criteria. These are the reasons why the traditional forms of scientific production must be included in the IBV activities, and therefore must also be included in the exchanged material in the KNEXT/IBV transaction space. However, the inter-disciplinary mode of this material exchange stresses the characterization of the KNEXT/IBV as a ‘transaction space’: in the very moment in which researchers of some disciplines are interested in using the bibliography designed for different disciplines, the ‘use value’ which these objects acquire must be different from the one given by its original ‘proprietors’. Thus, in the same way as “R+D methodologies” are exchanged to be used in different fields, the transactions of this material may be qualified as a exchange of ‘Mode-1 methodologies’, as ‘dissemination methodologies’ or ‘publication methodologies’.

The KNEXT/IBV possesses some specific lines of communication, created by the participants of the ‘transaction space’ (and not by institutions beyond its range, like the IBV formal organization) in order to decide which material may or may not be exchanged. These lines of communication are identified with the workflow process of the information management, which evaluates the knowledge cells susceptible of being included in the ‘transaction space’.

At this point, it arises the question whether any Information Technology could be considered as a ‘transaction space’ or not. It is already a commonplace to remark that the information technologies are one of the major global changes that give rise to the apparition of what Nowotny et al. label as ‘Mode-2 society’, and that elsewhere, and with different connotations, has been labelled as “information society” or “post-industrial society”. However, what it makes the KNEXT/IBV a ‘transaction space’ is not that enables the exchange of knowledge (and therefore, its reutilization), but the fact that also helps to contextualize that process, through the “context characterization” of the descriptive filters and the internalization of the quality control of all procedures. These two characteristics do not depend on the internal architecture of the software (which it could be used, for instance, as a tool for information exchange inside the traditional limits of a discipline) but on the software implantation process, which must guide it contextually, as it occurred in the search design and in the information management of the KNEXT/IBV.

The identification of that implantation process helps out in the characterization of the KNEXT/IBV as Mode-2 object. These are the physical entities in which the negotiation between scientific potential and constraints of the context may materialize, and that can be considered as one of the results of the contextualization. On the issue of knowledge reutilization, we have already seen that the KNEXT/IBV is a ‘transaction space’, since it is not a direct result of that contextualized process: the results would respond to the knowledge produced from the reutilization of the contextualized ‘knowledge cells’ of the KNEXT/IBV. Thus, there is no physical indicator of the contextualization process? In fact, what is really taking place is our inability to identify appropriately the contextuality process that ends up in the KNEXT/IBV as a Mode-2 object. It is the implantation process (the surveys between researchers, the decision to apply a “characterization of context”, the selection of descriptive filters, the design of the information management...) what it finally culminates in this contextualized Organizational Memory, which will later act as ‘transaction space’ in the process of reutilization. As in the case of the Design Configurations, (result from the interaction between the organizational knowledge and the context constraints, and which later did guide the production of a particular firm or even a whole industry sector), the KNEXT/IBV is a Mode-2 object resulting from a particular contextualization process, which, at the same time will act as heuristic tool in future contextualization processes. What is specific in this case is that these future processes employ as ‘transaction space’ the very KNEXT/IBV.

These previous words could be understood as a brief ‘chronology of contextualization’. It is still unresolved if this chronology may be applied generally to all casuistry or, on the contrary, it only describes the KNEXT/IBV case. It has been already mentioned that the ‘Design Configuration’ are the result of a contextualization process and source of future design and production processes, supposedly contextualized in originating around a Mode-2 object (the same ‘Design Configuration‘). In the ‘Human Genome Mapping Project’ case, a determined contextualization process (the negotiation between different communities of doctors, biologists and politics) ended up in a social and political entity, the ‘Project’ – and previously we have already observe in brief the intimate relation which the modern idea of ‘project’ may have with the dynamics of Mode-2 — able to reconcile the interests and perspectives necessary to carry out the research: again the Mode-2 object (the ‘Project’) is source of a following process (the execution of the project), again allegedly contextualized.

In the example of KNEXT/IBV, the dual character of the KNEXT/IBV, Mode-2 object and ‘transaction space’ at the same time, allow us to proceed in a more detailed manner with this chronology. The software implantation is the process that gives rise to a Mode-2 object, which is origin in itself of another contextualization process (to which, and now in a contingently way, the very KNEXT/IBV serves as ‘transaction space’) It could be hypothesized from this sequence that among contextualization processes of different nature (design-production, organization-research and implantation-reutilization) is necessary a Mode-2 object enabling that the accomplishments in the first process may be of best use for the second one. It is the physical reality of the Mode-2 object what it consolidates the stress of the initial contextualization, which endorses with a stable character, against the unavoidable provisional nature of the processes. And also it is this physical reality what gives continuity to processes of different nature, since its tangible character (its ‘objectivity’) may serve as result as well as origin of different perspectives, fact that did not come up with other types of non-physical entities (like an
idea or ‘construct’), whose very existence is backed up on the ‘incommensurable’ conceptual structures of a particular discipline.

These ‘chronologies’ allow to discover connections between close projects which in any other way may appear as discontinuous. In considering the Mode-2 objects not just as results of a contextualization process, but also as source of other processes, the researcher will be alert to perceive in the phenomenon a continuous sequence, more explicative of the relations between the processes, and between them and their environment, as it occurred in the KNEXT/IBV case. To think of the Mode-2 objects as a kind of ‘stop on the way’ in the effort towards contextualization (that is to say, stopping for a second to consolidate the agreements between knowledge and context before continuing through roads of different nature) may help to understand contextualization as a phenomenon of a greater evolutionary range, since in this way it is easier to trail its path along a more visible chronology: the Mode-2 objects being the ‘traces’ indicating the road chosen by the process in its negotiations with different contexts.

5. Conclusion

The study of the contextualization process in the production of knowledge through the analysis of the computer assisted Organizational Memory of a Research Institute (as in the case KNEXT/IBV) may cause different kinds of conclusions. Firstly, that this process might only be treated effectively through the second criterion exposed by Nowotny et al. It is true that it could result artificial to draw rigid lines between these three criteria, exposed originally as the three sides of the base of a pyramid arisen simultaneously – since each of triangles leans on the other two not to collapse – until converging in the apex of the production of contextualized knowledge. However, the contextualization processes are numerous and of very different nature, so it seems legitimate to ponder the importance of the three criteria according to the object of our study. The first criterion may be labelled as ‘sociologic’, and will be suitable for deepening in the processes (or in the aspects of the processes) that depend on the attitudes and beliefs of certain social groups, which will be the entities focused with a greater clarity by the analytic lens; the third would be a ‘epistemological’ criterion, useful for investigating the degree of contextual orientation of concepts and methodologies in a determined discipline. The second criterion could be concerned with a “production analysis” of the phenomenon, since directly questions about the negotiation operations (its dynamics and its control internalization) which bring forth the contextualized knowledge; the intra-organizational character strictly related to the knowledge production of the case summoned up in this article provides an example of contextualization study which employs this second criterion.

The study of the KNEXT/IBV as a case of contextualization ‘in the middle range’ was of great help in discussing the character of the ‘transaction spaces’ in the Information Technologies, and in concluding that it is not the information exchange in itself what it constitutes a ‘transaction space’, but the contextual character of such exchange, which not depends directly on the software architecture, but on its process of implantation. Finally, we proposed a ‘chronology’ of the contextualization ‘in the middle range’, in which the Mode-2 objects are, besides the result of these types of processes, source of other contextualization efforts of different nature, widening in this way the evolutionist
perspective exposed in ‘Re-thinking Science’ to phenomena of a greater temporal duration.