

SPACE AND THE SCIENTIFIC COMMUNITIES. A SURVEY AT THE UNIVERSITY OF LECCE

Stefano DE RUBERTIS

University of Lecce, Italy

1. Introduction

The perception of space, according to Kant, has a pre-eminent role in the transformation of experience into knowledge: together with time it is an *a priori* representation that makes it possible to order the amorphous mass of subjective perceptions. It is an absolute space, which can be represented via *pure intuition*, but is not the fruit of a simple mental construct: the objects and their geometry exist *per se* and represent the assumption on which the intuition is based.

Even today we may find traces of this way of looking at space in all fields of knowledge, as well as in daily individual experience, but tendencies towards more complex models are evident and frequent. As early as in the twentieth century, according to an authoritative literature, the shift in the very paradigm of knowledge from the Modern to the Post-Modern initiated a phase of profound transformation, which also had important effects on the concept of space. What seems to be broadly accepted is that this concept depends largely on the socio-cultural context of the individual that constructs it and uses it.

In the following pages I propose to investigate the popularity of this concept and the use that is made of it in the scientific community of the University of Lecce. In the first section I will try to provide an outline of the conception of *geographical space* (social and systemic) adopted in this study, starting with a few reflections on the limits of the traditional space-container and the reasons for its use. In the subsequent sections I will present the survey carried out in the field: the concept of space that seems to emerge from the various experiences of life and research is systematically compared to the parameter constituted by the concept of geographical space defined in section 1; the ultimate objective is to identify clusters of disciplines that share the same idea (or the same ideas) of space, and to attempt to evaluate the distance between them, in terms of complexity. The survey also provides information on the epistemological evolution (or "trajectories" we might say) of certain disciplines, revealing analogies, in some cases unexpected, between fields of research that have traditionally been held to be quite distant from each other, and prompting a few considerations on the way in which the interviewees interpret the great cultural changes of the last century.

2. Social space

The success of the idea of absolute space, clearly visible in the geographical tradition, can probably be attributed to the fact that it fulfilled admirably the practical purposes for which it was adopted: this undeniable advantage, together with the absence in our culture of equally suggestive and effective alternatives, meant that the lack of coherence between the model used and the «*spatial properties* of the objects represented» tended to be neglected [Dematteis, 1994, p.95]. Only in the last century did the efficacy of the representations based on Euclidean space begin to be questioned. According to Jammer (1966, pp. 148-168), it was Einstein who showed how geometry, applied in this way to the survey of physical space, ceased to be an axiomatic-deductive science and became one of the natural sciences – the oldest of all in fact. In general, the discoveries of modern physics seem to have completely demolished the validity of the Newtonian concept of absolute space.

Even now, in spite of everything, the common assumption is «that geometric space is objective reality and that the personal and cultural spaces are distortions»; perceptions of the obstacles to overcome in order to satisfy one's needs shape the space around the individual: «both space and time are oriented and structured by beings that have some objective (...): even the basic measures of length are derived from parts of the body». Thus it is the qualities of the actor that define the qualities of space that he or she is able to represent (Tuan, 1980, p.94). Praxis and daily activities tend to overcome the complexity of the spatial-temporal

process by reducing it to two distinct categories: space and time. Indeed, we may consider every individual representation of reality to be a translation (reduction) of it to a personal experience, filtered by the specific culture of a given social context. The operation involves the collocation of events in a system of Cartesian coordinates, whose point of convergence is “constituted by the subject-support of the sensations. (...The axes) cross in the *hic et nunc*, in the here and now, of the ego” (Marramao, 1990, p.7). The stratagem offers a common ground (to what extent this is real or illusory is difficult to say) for comparison and communication, it provides an opportunity to “stipulate” relatively stable conventions that define social relationships (language, norms, etc.), in a way that is compatible with the subjective spatial-temporal rhythm with which one “spatializes” and “temporalizes” each experience. The insertion of every individual into society (their “education” or socialization) causes their every perception to be instantly translated into the conventional system (Berger and Luckmann, 1999, p.179).

Although this attitude towards space is still widespread, the accumulation of anomalies and the less-than-perfect functioning of the models created on the basis of it have thrown it into its first serious crises. On the social level, the concepts of space and time are evolving, probably because the new ways of communicating, and thus of socializing, have brought to the fore phenomena whose relevance, in terms of intensity and effects, was previously completely marginal or relegated to certain traditional geographical scales (Castells, 2002, pp. 435 and 453). Furthermore, it has been shown that the perception of space is not necessarily Euclidean; moreover, its representation, accomplished with «signs and symbols», is conditioned by the culture of the community that produced those signs and those symbols (Harvey, 1980, pp. 29-30; Tuan, 1980, pp. 94-99). Space can be considered as a “subjective operator” which the observer uses as the ordering criterion of his or her sensations/observations (Dematteis, 1994, p. 91). Knowledge, that is, operates via the selection of data held to be meaningful: it is a process that disjoins, conjoins, organizes hierarchically and centralizes the object of each observation. All the operations are conducted according to a logic (a system of rules) dictated by a meta-discourse (an “over-logic”) that governs, *de facto*, our vision of the world; daily actions are dominated by disjunctive, reductionist and abstract principles, regulated by a sort of *paradigm of simplification*, which from Descartes onwards, has affirmed the idea, necessary for this process, of the rigid separation between subject and object. It is precisely the representation of reality as something distinct from the observer that leads us to consider object and subject as two independent entities. In contrast, if one adopts a systemic approach, each can be considered the reflection of the other («*paradoxe du double miroir*») (Morin, 1990, pp. 16-18 and 54-58).

The most important and complex aspect of space seems no longer to be its existence as an autonomous entity, but rather its cultural and social dimension. Society, individuals and the relations to which they give rise form the social space, constituting one big system in which subject, object and context are indissolubly linked. However hard the observer tries to objectivize their observations, they are also part of the system that is being observed (i.e. the social space), and the representations they arrive at must necessarily be partial, since they are not able to observe themselves. The complexity of the object, furthermore, makes it impossible to take account of all the relations connecting it to the overall system, let alone the infinite chain of actions and retroactions that characterize its workings: it is difficult, if not impossible, to estimate how much information is lost by neglecting those relations which cannot be taken into account (De Giorgi and Luhmann, 1993). As is this were not enough, the strong and time-worn influence of modern reductionism has led to a hyper-specialization of the itineraries of research, that is, to a further simplification/decomposition of reality, with the illusion, in every academic discipline, that the fragment being studied is coterminous with that reality (Morin, 1990, p.19). Often the various types of observable relations are selected on the basis of their quality (from which derives the multiplicity of spaces – economic, social, etc. – characterized by relations of various kinds) or on the basis of their spatial-temporal extension (hence the use of geographical scales and historic periods)... The results have frequently been significant however, opening up extremely fruitful lines of research, especially for the natural sciences (Crozon and Sacquin, 2001, p. 6; Morin, 1990, p. 18). Moreover, despite the limitations that have been encountered, there does not seem to be any sign of a truly alternative solution to some form of epistemological or merely methodological reductionism.

The necessity of having recourse to assertions that are not proven but generally accepted (axioms) for the demonstration of a theory, in itself creates the possibility that sooner or later anomalies will be detected that call into question even those assertions that have been demonstrated in a formally impeccable manner.

In the 1970s Harvey (1978, p. 28) pointed out that space in itself is neither absolute, nor relative, nor relational, but can become any one of these things, or even all of them, depending on the circumstances. The problem of the adequate conceptualization of space is resolved through the behavior of human beings towards it, and the question “what is space?” is thus replaced by the question ”Why do different behaviors give rise to different conceptualizations of space?”».

Assuming that what is meant by space depends on the social context, it is plausible that the intricate networks of relations arising on a local level in more or less restricted communities lead to notable differences in the modality of representation. Of course, it is very difficult to measure the extent to which relationships between individuals and their behaviors depend on the group to which they belong, but there may be similarities in the behavioral curves, despite the extreme complexity of the evolutionary mechanisms of community culture (Polmonari and Zani, 1980, p.177; Maffesoli and Marramao, 1996, pp. 14-32).

In academic communities for example, every individual organizes their own work strategy, establishes relationships with other communities near and far and constructs around themselves a network of distinctive relations, a portion of space. The characteristics of this portion of space condition the way in which it is perceived and represented, with obvious consequences for the scholar's research activity and his or her contribution to the dynamics of the discipline (Swales, 199).

In the following pages, I shall present a survey conducted among the teachers of a relatively small scientific community (the teachers of the University of Lecce; table n. 1). Focusing attention on the way of conceiving the relationship between *object*, *subject* and *contexts* of reference, I have tried to comprehend the role played by the concept of space in their professional activity, in their daily experience and in the obvious influences that they have on each other – their mutual “contamination”. The data gathered were analyzed, more or less explicitly, with reference to the concept of social and systemic space which has been outlined briefly in the preceding pages.

Tab. n. 1. The academic staff of the University of Lecce (30th May 2003)

POSITION	NUMBER
Extraordinary Researchers (Assistenti straordinari)	9
Research Assistants (Ricercatori)	260
Associated Professors (Professori “associati”)	226
Full-grade Professors (Professori “ordinari” and straordinari”)	178
Total	673

3. The interviews

The interviews were conducted with 27 teachers of the University of Lecce (table n. 2)¹. The size of the population made it impossible to conduct a complete survey and, since the objective was to identify the current “frontier” of the community's approach to the concept of space, probabilistic sampling was rejected in favor of interviews with privileged witnesses, selected deliberately. This being the university where I have worked for some years, it was relatively easy to select, for most disciplines, scholars that could be assumed to have

¹ Although the responsibility for the work is mine alone, I would like to thank Professor Maria Fiori of the University of Bari and Professor Angelo Belliggiano of the University of Molise, Professor Bianca Gelli and Dr Terry Mannarini of the University of Lecce, for their precious advice and comments on the method and the content of this research.

developed a certain awareness of the issue. The choice was restricted to associate and full-grade professors, so that their greater experience might enable the gathering of a greater quantity of information on consolidated traditions, as well as the changes, both recent and in progress.

Following a technique of non-probabilistic sampling (known in marketing as snowball sampling) (Guido, 1999, p.43), at the end of each interview the selected subjects, who were by then well informed as to the content and purpose of the research, were asked to indicate other colleagues suitable for interview. In total I gathered 17 new names in this way, 13 of whom were actually interviewed; in some cases interviewees declined to provide further names (probably for fear that by suggesting some names and not others, some sort of evaluation of their colleagues might be implied); in other cases (5) there was redundancy in the names indicated (they had already been selected by me or suggested by other interviewees).

Of the 27 interviewees, 9 were associate professors and 18 were full-grade professors. On average the interviewees had been in the University of Lecce for 18 years, and on average they had acceded to associate professor level 11 years before interviewing began (those with the longest service at these levels were professors of mathematics and literature).

Tab. n. 2. Interviewees by discipline, selection criteria and average years' service at associate professor level or above

SECTOR	NUMBER OF INTERVIEWEE	DELIBERATE SELECTION	SNOWBALL SAMPLING	AVERAGE YEARS' SERVICE AT ASSOCIATE PROFESSOR LEVEL OR ABOVE
Politics/Social Sciences (SPS)	1	1	0	1
Law (IUS)	3	2	1	5
Economics and Statistics (SECS)	6	4	2	5
Industrial Engineering and (IT - ING-IND)	1	1	0	13
Philosophy (M-FIL)	1	1	0	13
Biology (BIO)	2	1	1	16
Philology-Literatures (L-FIL-LET)	2	0	2	19
Mathematics (MAT)	4	1	3	20
History and Art (L-ART)	1	0	1	(Not available)
Physics (FIS)	5	3	2	2 (Only 1 interw.)
Archaeology (L-ANT)	1	0	3	(Not available)
Totals and average	27	14	13	13

10 out of 27 had experience of working in other Italian universities and 5 had conducted research abroad (in various capacities) for periods of more than 6 months. Nearly all of them however, with varying degrees of regularity, spend shorter periods at other Italian or foreign universities.

The interviews (except the 3 test interviews), were arranged by telephone and were conducted between the 19th of June and the 22nd of July 2003. For practical reasons the interviews with one history teacher who had been deliberately selected and four teachers (one jurist, two mathematicians and a physicist) suggested by other interviewees were not carried out.

The interview structure, relatively flexible, contained 19 main questions (non-modifiable) and numerous sub-questions to be adapted to the individual interviewee and particularly to the

various academic disciplines. This was in order to counteract the highly general character of the main questions, which were answered by interviewees with widely differing profiles.

Tab. n. 3. The main questions

I. Preliminary Information	Name and Surname, Title, Discipline, department; at the University of Lecce since..., experience at other universities; What is your current main research topic?
II. Indirect Information on the concept of space	Can you describe the argument of study of your discipline? How would you define the method generally adopted in your discipline? Can you describe the context (the environment, the reference space) of the argument of study? Is the argument of study systematically collocated in a precise spatial-temporal context? Has the argument of study of your discipline changed over the last few decades? Have the ways of referring to the contexts (to the environment, to space), their importance and their nature changed over the last few decades?
III. Direct Information on the concept of space	In your opinion, what is space? In your research activity, is space: an insignificant variable, barely to be considered, important, decisive, ...? Do you think that the concept of space has been affected by the great cultural changes of the twentieth century? For which disciplines or for which fields of research do you believe space is a decisive or highly important variable? Could you give me any bibliographical references to the concept of space (or environment or context) commonly cited in your field of research or your discipline? Can you suggest any other teacher for interview?

The questions (table n. 3) may be distinguished into three large groups:

- group 1 is to gather personal information on the interviewee;
- group 2 is to construct an initial, indirect definition of space and the recent developments in the discipline;
- group 3 is to tackle explicitly the theme of the concept of space, comparing the concept used in the teacher's professional activities with that of daily experience.

All the professors contacted gave their consent for the interview, which lasted about 40 minutes on average².

4. The distance from geography

The entire survey, as we have said, centers on the concept of space and the use that is made of it in the various disciplines and in the research activities of each interviewee. To reduce the risk of lexical and conceptual misunderstanding, at least in the first part of the interview, I preferred to use the term *contesto* (the Italian for "context") rather than *spazio* (the Italian for "space"), which in the various disciplines often takes on highly different meanings. This approach made it possible to tackle the question from the desired point of view right from the start: by looking at their way of interpreting the relationship between subject, object and context within their respective disciplines, the pre-conditions for a comparison with my own social space of reference were met.

In the third group of questions the intentions of the interviewer became more explicit and, besides prompting the professor to offer a more personal view, were designed to obtain information helpful for the interpretation of the answers to the previous group of questions. Specifically, I sought to ascertain:

- the correspondence (or lack of it) between the concept of space and that of context for the interviewee;

² Subsequently other academics were also contacted with a view to following up the research with more detailed studies for each faculty, but refusals and postponements, linked to summertime commitments or to the holiday period that was by then looming, meant that the survey had to be suspended.

- the position of the professor with respect to the “official” approach of the discipline, and the relationship with his or her way of conceiving of space.

After having analyzed the results of the interviews, the spaces and the contexts described by the interviewees were classified according to the following categories:

- *theoretical*, made up of norms and jargon belonging to the discipline (e.g. mathematical theorems, laws of physics, etc.);
- *technical*, made up of homogeneous groups of elements, considered to be real, to which the object under study belongs (sector, physical environment, economic environment, financial environment, etc) and which often correspond to a space-container;
- *social*, represented by the socio/cultural environment of the object (i.e. the history and culture that are linked to it);
- *systemic*, a sort of combination of the previous two (at times of all three), implying a systemic vision of reality, or tending towards this (often revealed by the importance attributed to the relationship between object and observer);
- *combinations* of the previous types.

To each of these categories corresponds a score expressing the estimated distance of their meaning from the corresponding reference meaning, that is from the idea of “context” held (in my view) by the geographical disciplines in general and my own personal idea of systemic space (table 4).

Each interviewee was thus assigned a pair of values, used as Cartesian coordinates, in a graph whose horizontal axis shows the position of each researcher with respect to the use of “context” in their particular discipline and whose vertical axis shows their position with respect to their personal use of the concept of space (figures 1 and 2).

A position very close to the origin of the axes might be taken to indicate the attribution of low importance to the two concepts (at least on a conscious level), collocated at the maximum possible distance from my geographical approach.

Tab. 4. Criteria for the evaluation of the distance between disciplines of the concepts of space and context

CATEGORIES	“PROXIMITY” TO CONCEPTS OF REFERENCE	CATEGORIES	“PROXIMITY” TO CONCEPTS OF REFERENCE
Theoretical	1	Technical and systemic	6
Theoretical and technical	2	Social	7
Theoretical and systemic	3	Social and systemic	8
Theoretical and systemic	4	Systemic	9
Technical and social	5		

Geography (which is not the object of the survey, but rather an instrument and a parameter of reference) is collocated in a position diametrically opposed to the origin (at coordinates: 9;9), corresponding to the maximum values attributed to spaces and contexts³.

In figure 1, each interviewee is indicated by the initials that mark the discipline. Their distribution with respect to the diagonal of the quadrant (only 5 out of 27 are below it) indicates that the individuals believe that they attribute a greater complexity to their way of

³ For evaluating the distance from geographical concepts, it might have seemed more effective to have a graph with Geography at the origin of the axes; this choice however might have given the impression of excluding *a priori* the possibility of reaching further levels of complexity via fruitful new approaches that cannot currently be predicted.

using the concept of space than the main currents in their discipline. In other words, it means that the way in which they live and perceive space in their daily lives is different (i.e. more complex) than the way in which they believe it is used within the discipline. The interviewees lying on the line itself may be interpreted as cases of close symmetry between the positions generally taken in the discipline and those adopted by the interviewee and/or a strong contamination between the space that is “thought” in the discipline as a whole and the space that is “lived” in daily experience.

The disciplines that have a value on the horizontal axis of between 1 and 4 (the section to the left of the dashed lines), with some exceptions, are all of a prevalently quantitative type: we are dealing here with the so-called sciences of explanation that describe and generalize. The one exception is a law professor who attributes an important role to the concept of space in the definition of the object of the discipline but whose *de facto* role, on the basis of the other answers given, is that of a simple container.

The disciplines with a value on the horizontal axis of between 5 and 7 (between the dashed lines) represent a sort of border region between the approaches of the exact sciences and those of the social sciences and humanities. These are disciplines or sectors which boast a long history but which are undergoing or have undergone profound transformations in the methods of research or in their relationship with the topic under study: some have discovered the utility of quantitative modeling and methods (numerical and IT applications in particular), others are more interested in phenomena at the *micro* level (high scale), the uniqueness of their observations and the use of inductive and descriptive methods.

The disciplines lying to the right of the dashed lines (with values on the horizontal axis of 8 or 9) attribute an extremely high level of complexity to the object and to its context (the line between the two becomes increasingly blurred). The interviewees seem to have adopted an approach that tends to the systemic and are explicitly aware of the limits and of the problems posed by the “paradigm” of complexity.

5. The families of spaces and contexts

By taking into account the other answers, besides those obtained for “context” and space, it is possible to make some further considerations regarding the disciplinary trajectories and their collocation with respect to their objects of study. The most useful information for our purpose concerned the influence that the concept of space they adopted exerts on their research activities, on the prevailing methods used in the discipline and its principal topic of study. Three new groupings resulted from this (shown in figure 2 as families A, B and C) from which only 2 interviewees were excluded: an economist (the only person with a zero value on the horizontal axis), whose way of using the “context” I was unable to evaluate, and a meteorological physicist who used complex, systemic models of space (very similar to those used by “family C”) that were influenced by the geographical tradition that once dealt with that field but which also shared certain salient characteristics of physics, who is included in “family A”. *Family A* is composed of mainly quantitative disciplines that use a highly formalized language and are orientated especially towards the description and interpretation of phenomena. In 9 of these a mainly deductive method is used and the experimentation is characterized by the search for generalizations (table n. 5). The sense attributed to the concept of context is mostly not very complex, although it may be complicated in a few cases (especially for mathematicians and physicists).

The space of reference in their research activities almost always coincides with the theoretical baggage of the discipline: it represents the complex of limits and opportunities (theories that have been verified and are yet to be verified, problems resolved and yet to be resolved) that trace the path of research. In one case in particular, mathematical space was described as a system that constitutes not so much the background to the problem as an integral part of it, interacting with it in the determination of solutions, at times even representing the solution itself (or rather the structure and the properties that are attributed to it).

The concept of space, in this family of disciplines, is relegated to an almost entirely theoretical universe that has only sporadic instances of contamination with the space of daily life and experience. In three cases it is considered a simple container with little or nothing in common however with space as it is conceived in everyday life.

On average, the interviewees of this family had acceded to the level of associate professor 14 years before interviews began (they thus represent the group with the most academic experience); for half of them, their field of study and the context have undergone constant evolution.

Three interviewees referred to a turning point that had come about in the 1970s or 1980s, associated with the rise of a new environmental awareness, the “discovery” of the irrationality of economic forces and the introduction and spread of powerful computers.

Fig. n. 1. Space and context according to the interviewees

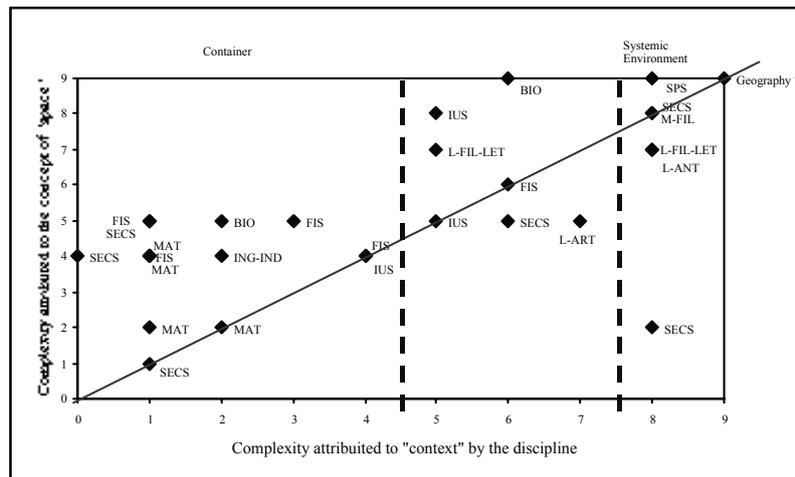
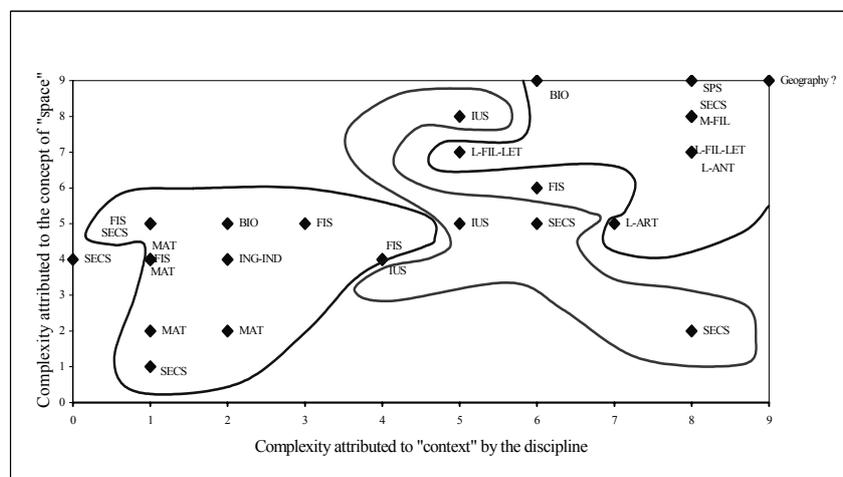


Fig. 2. “Families” of interviewees according to the evaluation of the concept of space



Family B takes in all three sections identified in figure 1. What emerges is the remarkable and rapid transformation of the concept of space in the disciplines involved and in the researchers' activities (on average, the interviewees of this family had acceded to the level of associate professor only 5 years before interviews began).

The phenomena arising from so-called *globalization* have changed the spatial frames of reference, probably prompting numerous reflections on the theme. Signs of the transition can be seen in the perceived inadequacy of the old descriptive-interpretative function, until recent times the method mainly attributed to these disciplines: an exquisitely deductive method is increasingly integrated with an inductive approach; the territory is increasingly viewed as the *systemic* environment of the phenomena being studied (table 6).

In general, the context and the space of reference are still mainly a sort of technical environment, the result of the selection of relations directly involved in the representation of the topic under study.

Tab. 5 - Composition of “family A”

DISCIPLINES	N°	OBJECT OF STUDY
Mathematics (MAT) Everything depends	4	Mathematical analysis is everything. on who is doing the investigating. Topology depends on the curiosity of the researcher
Physics (FIS)	4	Chaos – non-linearity. Applications of physics. Elements and relations between them, on various scales
Economics/Statistics activities. Data gathering (SECS)	2	Social Coordination of economic and calculus of inference from the sample to the entire population
Engineering (ING-IND)	1	Design, management and maintenance of machines
Biological (BIO)	12	“Sorting” of the exemplars into various groups
Family Total	12	The focus is always on the elements; only in one case is attention paid to sector relations. The context is always limited to the specific sector

There is an awareness however of the existence of a broader and more complex context of reference – Indeed, in 4 out of 5 cases there seems to be a tendency towards its inclusion in the field of study of the discipline; however, the concept of space used on an individual level seems to be closer to a space-container rather than a systemic space, confirming the sensation of uncertainty typical of periods of change. In this group too, external shocks have been the origin of profound disciplinary restructuring: in the 1950s, the Italian constitution and, as part of this, the institution of the Constitutional Court; in the 1970s, Becattini's heterodox studies of the industrial districts (which were to have relevance for many economic disciplines); in the 1990s, the strengthening of the European community and its ability to shape national legislation, modifying the traditional scale of application of laws and regulations.

In *family C* the recourse to a purely deductive method is much less frequent than with “family A” (only 4 out of 8 cases).

Tab. 6. Composition of “family B”

DISCIPLINES	N°	OBJECT OF STUDY
Legal (IUS)	3	Relationships between authority and liberty, on a national and international scale. Different institutional set-ups among nations, the relationship between freedom and power. Evolution of contracts
Economic (SECS)	2	Financial System: rules for companies and markets. Functions and sectors of companies and the territorial context
Family Total	5	In one case alone the focus is on the elements of which the object of study is composed. In the other cases, albeit indirectly, the focus is also on the relations between the elements and, to a lesser degree, with the contexts

Re-reading the interviews of this group one has the clear sensation of a greater attention on the part of the interviewees to daily experience and to everyday life; what emerges clearly is the desire to comprehend this via their own personal research itineraries. This has probably stimulated reflections on the complexity of reality and on the limits of its representations.

For all the interviewees of this “family” (whose years of service at associate professor level or above corresponds approximately to the general average) the reference to a precise temporal-spatial context is fundamental and 6 out of 8 hold that their concept of space has decisive effects on the methods and outcomes of their research.

A systemic vision of reality, society and space is dominant (in 3 cases the last two terms are considered to be equivalent). There is a clear awareness of the inherent limits of the instruments inherited from the Modern period, but this does not mean they are rejected out of hand. This is shown by the attention given to generalizations and models.

The “critical” reductionism that animates this group seems to consciously drive the concept of space towards positions characterized by a strong cultural and social imprint. The attention to the study of the elements is equaled by that paid to the study of the relations between the elements. Among these, a pre-eminent role is reserved for the relationship between object and subject, which I interpret as a consequence of the affirmation of a plurality of viewpoints and the questioning of modern “certainties”.

Family C includes mainly humanistic sciences, with the exception of one economic discipline (with a markedly social and systemic approach) and one biological discipline. In the latter case, the interviewee presents a rather eclectic position with respect to the typical stereotype of the biologist, a systematic discoverer and classifier of living species: this person's holistic and systemic vision of reality drives them to provocatively define sociology as a branch of biology. Far more orthodox is the position of the other interviewee from the same disciplinary grouping included in family A.

As for the evolution of object and context, in 5 cases reference was made to the structuralist influence: new light is shed on the relationship between art and economics, greater attention is paid to the contexts of reference, there are efforts to generalize and to render the methods of certain humanistic disciplines more scientific – e.g. archaeology. In this group too we find the influence of Becattini, who, with his approach to the concept of territory has contributed to laying the foundations for the diffusion of a systemic concept of space.

6. Final considerations and conclusions

With respect to the objective that I had set myself, the results appear predictable in some ways, but also contain a few surprises.

My initial conviction, which I believe to be a modern one, of being able to outline a model of space that might constitute a fixed point of reference for all the disciplinary groupings, was undoubtedly disproved. The “spaces” of research in the scientific community studied are numerous and the diverse characteristics attributed to them seem to depend mainly:

- on the attitude in the dominant currents of the discipline;
- on the personal point of view of the researcher.

The 3 broad families of meaning attributed to the concept are internally fairly homogeneous and the remarkable differences among them, at least between the two most numerous families, make it difficult to recognize other particularly meaningful groupings that, for example, may bridge the traditional distinction between science and the humanities (sciences of explanation and sciences of comprehension). Moreover, up to a point, *effects of proximity* seem to be operating: the “places” of research and teaching for families A and B are all concentrated in two groups of buildings, known as the *Polo Scientifico* and the *Ecotekne*, on a campus a few kilometers outside the city (with just a few hundred meters between them); the “places” belonging to the disciplines of family C in contrast all lie within the city (three near the old town, two in the suburbs, having moved there recently). Without carrying out further research however, this particular circumstance cannot be assumed to be anything other than coincidental.

On the other hand, it may be stated with rather more certainty that the articulate context of reference of the research in the University is made up of an irreducible multiplicity of spaces, structured and regulated in ways that differ not only from discipline to discipline, but even from researcher to researcher. This is furthermore confirmed by the reference bibliography provided by the interviewees on the object of this particular survey: the low number of responses (only 14 out of 27) indicates a certain lack of attention to the question and the variety of the authors indicated confirms the use of highly different approaches⁴.

The way of conceiving of space, evidently, is linked to patterns of acquiring knowledge that have matured individually and are not always entirely shared by the rest of the

⁴ The authors of reference for the interviewees are Bakhtin, Bjercknes, Bourdieu, Cacciari, Cook, Dionisotti, Durkheim, Einstein, Ferrarese, Forestieri, Golinelli, Heidegger, Hodder, Hurewitz, Husserl, Irti, Kant, Lorenz, Maturana, Odum, Onado, Rossby, Varela, Vitell, von Bertalanffy, Zappa.

community, whether this be understood as a disciplinary grouping, department or faculty: all this makes it hard to provide generalizations or some universally valid explanation.

Tab. 7. Composition of “family C”

DISCIPLINES	N°	OBJECT OF STUDY
Philological (L-FIL-LET)	2	Morphology of narrative and of the text. History of the Italian language
Sociological (SPS)	1	Society, social relations, communication, on various scales
Economic (Sec)	1	Company System
Philosophical (L -Fil)	1	Relationship between subject and object, propensity to question oneself
Archaeological (L -Ant)	1	Culture of the past, settlement archaeology, reconstruction of the sense of spaces
Biological (Biol)	1	Animals: from the molecular to the community scale
History Of Art (L -Art)	1	Painting
Family Total	8	Elements and context are inseparable, as are object and subject. Approaches tend to be systemic (4/8). The focus is on the element (5/8) and is always accompanied by an emphasis on the role of relations (4/8) or of systems (1/8)

In the communities studied, the cultural transformation on which so much emphasis is placed even in the geographical literature, stressing the importance of the effects of the changed attitude towards space, does not seem to have been experienced with particular intensity: if it took place at all, according to the interviewees, it affected the whole of the twentieth century and not just its second half. Only 3 scholars in this study made a more or less explicit reference to the Modern/Post-Modern debate, but many more (8, of which 6 belong to families B and C) stressed the role that the space-time convergence resulting from telecommunications and transport has had on the way of perceiving space, including within the discipline. There is now a common perception of fast and virtually unlimited freedom of movement, with a consequent restructuring (to varying degrees) of the horizons of reference of one's discipline and one's personal field of research. But apart from these and a few other cases, especially in family A, knowledge is understood as a linear, continuous and cumulative process. The discontinuity (the big paradigmatic changes), according to many of the interviewees, are only apparent. This should not surprise us: Kuhn himself «observed that the notion of paradigm, born as a *macro-historic* notion, (...) is really a *micro-historic* notion, adequate for the description of common standards that are shared in specific historic moments by specific communities (or sub-communities) of scientists» (Ceruti, 1986, p.56). From a post-modern point of view, it should be recognized that the specificities detected in the examined community generate a *local* system for the legitimization of knowledge (cf. Lyotard, 1985), which cannot be assimilated to the trajectories that are held to be dominant (or to enjoy priority) in the literature. At the same time, we must not forget that for a large number of interviewees the scientific approach and the attitude towards space is of a "traditionally Modern" type, albeit with a mature awareness of the limits that it entails. The problem then is not so much to comprehend the time-scale, the reach and the ways of change in the community of reference, as to verify whether it has taken place at all.

REFERENCES

- Berger P.L. and Luckmann T., 1999, *La realtà come costruzione sociale*, Bologna, Il Mulino, orig. pub., 1966, *The social construction of reality*, New York, Doubleday and Co.
- Castells M., 2002, *La nascita della società in rete*, Milano, Università Bocconi Editore, orig. pub., 1996, *The rise of the network society*, Oxford, Blackwell.

- Ceruti M., 1986, *Il vincolo e la possibilità. Presentazione di Heinz von Foerster*, Milano, Feltrinelli.
- Crozon M. and Sacquin Y., 2001, "Avant-propos", Crozon M. and Sacquin Y. (eds), *L'élémentaire et le complexe*, Les Ulis, EDP Sciences, pp.1-6.
- De Giorgi R. and Luhmann N., 1993, *Teoria della società*, Milano, Franco Angeli.
- De Rubertis S., 2003, *Spazio Produzione Regolazione. Strategie post(?)fordiste nei sistemi locali di Tricase, Prato e Grenoble*, Milano, Angeli.
- Dematteis G., 1994, *Le metafore della terra*, Milano, Feltrinelli, orig. pub. 1985.
- Guido G., 1999, *Aspetti metodologici e operativi del processo di ricerca di marketing*, Padova, CEDAM.
- Harvey D., 1978, *Giustizia sociale e città*, Milano, Giangiacomo Feltrinelli Editore, orig. pub., 1973, *Social Justice and the city*, London, E. Arnold Publishers Ltd.
- Harvey D., 1980, "Alcune controversie metodologiche in geografia", Vagaggini V., *Spazio geografico e spazio sociale*, Milano, Franco Angeli, pp.19-78.
- Jammer M., 1966, *Storia del concetto di spazio*, Milano, Feltrinelli, orig. pub., 1954, *Concepts of space*, Cambridge (USA), Harvard University Press.
- Liotard J.-F., 1985, *La condizione postmoderna*, Milano, Giangiacomo Feltrinelli Editore, orig. pub., 1979, *La condition postmoderne*, Paris, Les Editions de Minuit.
- Maffesoli M. and Marramao G., 1996, *Le culture comunitarie. Zone di confine. Introduzione di Giorgio de Finis*, Roma, Il Mondo 3 Edizioni.
- Marramao G., 1990, *Minima temporalia. Tempo spazio esperienza*, Milano, Il Saggiatore.
- Morin E., 1990, *Introduction à la pensée complexe*, Paris, ESF éditeur.
- Polmonari A. and Zani B., 1980, *Psicologia sociale di comunità*, Bologna, Il Mulino.
- Swales J.M. 1998, *Other floors other voices. A textography of a small university building*, Mahwah, New Jersey, Lawrence Erlbaum Ass.
- Tuan Yi-Fu, 1980, "Spazio e luogo, una prospettiva umanistica", Vagaggini V., *Spazio geografico e spazio sociale*, Milano, Franco Angeli, pp. 92-129.