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Spatial and Temporal Expansion of the Object as a Challenge for Reorganizing Work

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Introduction: Objects in Expansion

In theories of postmodernity, the notion of *compression* of time and space has become widely accepted. As Harvey (1989: 240) put it, "space appears to shrink to a 'global village' of telecommunications" and "time horizons shorten to the point where the present is all there is." In his account of changes in work organizations, Sennett (1999: 22–27) continues the compression argument and declares that today's work settings operate on the principle of "no long term." According to Sennett (1999: 25), this "short-term capitalism" corrodes the character: "'No long term' means keep moving, don't commit yourself, and don't sacrifice."

While there is plenty of evidence for compression in our everyday experience, authors such as May and Thrift (2001) have good reason to warn for underdeveloped analyses behind claims that only see compression and shrinkage in our spatio-temporal worlds.

> To some considerable extent, this under-development is a consequence of too heavy an emphasis being placed upon developments in transport and communication technologies and not enough upon developments elsewhere both in the field of technology (or what we prefer to call the domain of instruments and devices) as well as across a number of the other domains through which the experience of TimeSpace is rendered. When these more numerous developments are considered, and the connections between each traced, the picture is less of any simple acceleration in the pace of life or experience of spatial "collapse" than of a far more complex restructuring in the nature and experience of time and space. . . . With these changes space is seen to both expand and contract, time horizons to both foreshorten but also to extend, time itself to both speed up but also slow down and even to move in different directions. (May and Thrift, 2001: 10)

We agree with May and Thrift that transport and communication technologies are an insufficient basis for analysis. Beyond that, we maintain that technologies and instruments in general, separated from the objects upon which they are used, are an equally insufficient basis. We argue that a new, more interesting insight into the developmental dynamics of timing and spacing in work organizations can indeed be gained if we shift the focus of analysis onto the *objects* of work. We suggest that the ongoing historical transformations in objects of work are best conceptualized as *expansion* rather than compression.

In cultural-historical activity theory, human conduct is seen as object-oriented activity. Leont^_ev (1978: 52) pointed out that the concept of object is already implicitly contained in the very concept of activity; there is no such thing as objectless activity. An object is both something given and something projected, anticipated and constructed. An entity of the outside world becomes an object of activity as it meets a human need. This meeting is "an extraordinary act" (Leont^_ev, 1978: 54). In this constructed, need-related capacity, the object gains motivating force that gives shape and direction to activity. The object determines the horizon of possible actions.

The subject constructs the object, "singles out those properties that prove to be essential for developing social practice," using mediating cognitive artifacts that function as "forms of expression of cognitive norms, standards, and object-hypothesis existing outside the given individual" (Lektorsky, 1984: 137). In other words, objects are constructed and invested with meaning by means of cultural tools. Such mediating tools operate not separately but in complex constellations we call *instrumentalities*. Emerging new objects call for and generate new instrumentalities.

Our activity-theoretical concept of object is related to Knorr-Cetina's recent work (1997, 1999, 2001; see also Latour, 1996; Rheinberger, 1997; and Daston, 2000 for related arguments). Knorr-Cetina (1997: 9) makes the bold claim that "objects serve as centering and integrating devices for regimes of expertise that transcend an expert's lifetime and create the collective conventions and the moral order communitarians are concerned about." Her contribution is a call for serious attention to objects of work as sources of new kinds of motivation and sociality. The problem in her work is its relatively weak historicity. Knorr-Cetina distinguishes between "technical objects" and "epistemic objects." The latter are typical to scientific work and expert-like work in general. They are openended "processes and projections rather than definitive things" (Knorr-Cetina, 1997: 12), implying a radical expansion of the temporal and spatial dimensions of work. But the emerging characteristics of such epistemic objects of expert work are left very vague.

Stepping into the realm of management and organization studies is helpful in opening up the historical and practical landscape of objects of work. Victor and Boynton (1998) suggest that we can examine the evolution of work in capitalism as a succession of five major types: craft, mass production, process enhancement, mass customization, and co-configuration. The last one of the five, co-configuration, is particularly interesting from the point of view of the spatio-temporal expansion of the object.

> When a firm does co-configuration work, it creates a product that can learn and adapt, but it also builds an ongoing relationship between each customer–product pair and the company. Doing mass customization requires designing the product at least once for each customer. This design process requires the company to sense and respond to the individual customer's needs. But co-configuration work takes this relationship up one level—it brings the value of an intelligent and "adapting" product. The company then continues to work with this customer-product pair to make the product more responsive to each user. In this way, the customization work becomes continuous.
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> . . .
>
> Unlike previous work, co-configuration never results in a "finished" product. Instead, a living, growing network develops between customer, product, and company. (Victor and Boynton, 1998: 195)

A hallmark of co-configuration is "customer intelligence." To achieve it, a company will have to continuously configure its products and services in interaction with the customer. Victor and Boynton (1998: 197) name medical devices and computer software systems as two leading industries where co-configuration is being implemented. They emphasize that co-configuration is more than just smart, adaptive products.

> The application of configuration intelligence to the product creates a system of customer, product or service, and company. The complex of interactions among all three, as a product or service adapts and responds to the changing needs of the customer, is the underlying, dynamic source of value. . . . With the organization of work under co-configuration, the customer becomes, in a sense, a real partner with the producer. (Victor and Boynton, 1998: 198–199)

Victor and Boynton focus on customer-intelligent products, such as sophisticated digital hearing aids, as examples of co-configuration. It is more difficult, but equally important, to determine what kinds of services and administrative products might be "customer-intelligent" and co-configurational.

Standardized services and administrative decisions delivered on the spot do not qualify. But what about trajectories of complex investigations of economic crimes produced collaboratively by the police, the tax officials, and the prosecutors? Or multiyear crop rotation trajectories for organic vegetable farms produced collaboratively by advisors and farmers? Or long-term care trajectories of chronically ill patients produced collaboratively by primary care health centers, hospitals, and patients?

These are relatively novel objects of work. The very notion of trajectory is an attempt to interweave the temporal and the socio-spatial, as it "refers to a course of action but also embraces the interaction of multiple actors and contingencies that may be unanticipated and not entirely manageable" (Strauss, 1993: 53). We claim that compared to their predecessors, the objects we just listed are expanded both spatially and temporally. In the following three case studies, we trace the objects and their expansion in economic crime investigations, in organic vegetable farming, and in the medical care of chronic patients with multiple illnesses.

The creation, mastery, and maintenance of such expanded objects is a demanding and contradictory challenge to the parties involved. Expanded objects require and generate, and are constructed by means of, novel mediating instrumentalities. In each of the three cases, we will examine the new instrumentalities as they emerge in interaction with the new objects. In each case, we will discuss only selected examples of the new instruments; an examination of their full variety and complexity is not possible within the constraints of this chapter.

Case 1: Expansion of the Object in the Investigation of Economic Crimes

A "traditional" crime, such as robbery or homicide, always takes place at a certain time and place. Economic crime, or white-collar crime as it is often called, is much more complex: it is often committed over an extended period of time, and nobody can point to an exact time at which the boundary between legal and illegal was crossed. Nor can an exact place for a white-collar crime be appointed: the perpetrator may have a permanent residence in one location, the company domicile may reside somewhere else, and company property may even be located in other countries (see, e.g., Geis, Meier, and Salinger, 1995). In addition to the difficulties in placing this kind of a crime in time and place, it often requires a lot of work to show that there is a crime in the first place—economic crime often toys with the thin line between legal and illegal.

The investigation of economic crimes has initially followed the investiga-

Figure 7.1 **A Sequential Model of White-Collar Crime Investigation**

Source: Puonti, 2001b.

tion lines of more traditional types of mass crime—local police departments investigating and asking for assistance from other police departments and agencies when needed. The traditional model of investigation may be compared to a track relay: each agency takes care of its own part of the investigation, often sequentially and passing the baton through documents without personal contact. A simplified example of a tax-crime investigation according to the traditional mass-crime model is presented in Figure 7.1.

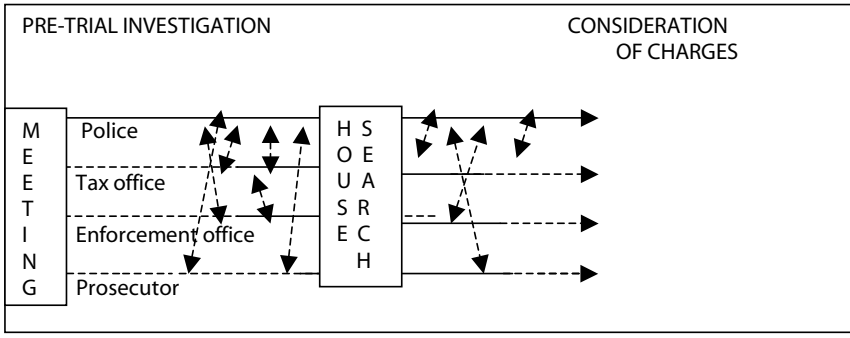
However, it is practically impossible to investigate temporally and spatially distributed economic crimes without collaboration between agencies. Investigation may be started at one police department and then moved to another. As the crime does not obey the boundaries between different authorities either, collaboration is needed also between the police, the tax authority, the enforcement authority, and the prosecutor as the most regular partners have to find new ways of collaboration to fight this type of crime efficiently. A parallel model of collaboration between Finnish authorities has been promoted in efforts to control white-collar crime. In Figure 7.2, the horizontal arrows represent movement in time and the vertical arrows represent interaction between the participants.

In the ideal model, investigation starts with a stakeholder meeting in which the goals, resources, timetables, and actions are preliminarily negotiated and agreed upon. The investigation often culminates in a collaborative house search, which is the crucial tool for getting information about the criminal activity.

The parallel model of investigation increases interaction between organizations but it is also changing radically the dimensions of time and space for the participants. These dimensions have to be understood in a new way: the police officers, tax inspectors, enforcement officers, and prosecutor need to form a collaborative community that is involved in the case for the whole period of pre-trial investigation. No longer will the investigation involve each agency separately and sequentially in its turn.

A key challenge in economic crime investigation is the complexity of the crimes themselves and the multiple aspects one crime may include. No one has been able to provide a generally valid definition of white-collar crime,

Figure 7.2 **Parallel Model of White-Collar Crime Investigation**



and even if one could be reached, crime itself changes all the time (see, e.g., Friedrichs, 1996: 5–7; Laitinen and Virta, 1998: 11–14). We should also stress different sides of the crime and its investigation. Is it more important to recover the criminally gained profit or to get the perpetrator to prosecution? Is it more important to stop the criminal activity or to ensure that the creditors will get their money back? The emphasis in economic crime investigation has lately been on the restoration of criminally gained profit to stop criminal activity more efficiently. It has been claimed that the restoration of criminally gained profit could form a common goal for the authorities. In practice, the crime and its investigation must be constructed separately in each investigation process, in collaboration among the participants.

Temporal Expansion of the Object in Economic Crime Investigation

A specific feature of economic crime is its temporal fragmentation. It is difficult to say when a crime was committed; in the reports of offense the time is often marked according to accounting periods such as "between 5/1/1996 and 4/30/1997 and between 5/1/1997 and 4/30/1998." The crime itself may consist of short-term actions spread over a long period of time, often several years. Economic crime is also carefully planned: for example, the operating periods of criminal companies are so limited that the rigidly reacting authorities would not be able to notice the crime until the company has been terminated and the operations and property moved on to the next company.

The investigation of a traditional crime normally starts after the crime is committed and a report of an offense is made. The new challenge that has come along with economic crimes is to find real-time evidence of an ongoing crime. This is necessary in order to retrive the criminally gained property

from the perpetrator and thereby stop the criminal activity permanently. This often leads to a long period of intelligence and information gathering before the active pre-trial investigation.

The object of economic crime investigation is not a standardized item but a complex entity that is both spatially and temporally different from the object of traditional crime investigation. The investigators of so-called mass crimes are facing a situation where their main problem is the vast number of cases under investigation. They often have a workload that seems quantitatively impossible to handle.

> Excerpt 1
> There [in the previous work context of mass crime investigation] the volume was totally different. The number of cases may well have varied between 50 and 150. . . . you'd have 150 cases and you'd have to remember and know what and who are there [in the case], whom to interrogate, and you even should investigate a little. . . . You couldn't just watch around for a couple of days because new stuff [cases] kept fluxing in. . . . There's the problem that the rhythm was so tough, you had to go fast all the time, clients kept coming in and phones kept ringing, and new cases coming in, it's exhausting.

In economic crime investigation, the number of cases per investigator is radically smaller but the quality of the cases requires a new kind of case management. The work of one of the economic crime investigators we followed was blocked because all four cases he had under investigation were awaiting for the output of another stakeholder in the case (prosecutor, tax inspector, accounting specialist). One of the cases was particularly frustrating for him because the tax inspectors had promised to give a preliminary tax inspection report in a couple of weeks and it was remarkably delayed. The tax inspectors were tied up with other work commitments and the start of the inspection was postponed several times. Each day, the police officer was expecting the reports to be finished. This waiting was nothing new to him. When asked about the future, he said laconically: "The same pattern again. We'll be waiting for the tax authority again."

In this case, the delay of the preliminary tax-inspection reports from the originally promised "a couple of weeks" to four months triggered a series of postponements. When the preliminary reports were finished, the police, the enforcement officer, and the tax inspectors had so many commitments due to other cases, holidays, and training courses that a mutually acceptable time for a house search could not be found in the spring, and it was postponed until the fall. In the fall, another complex crime case engaged the police officers, the tax inspectors, and the enforcement officers at the unit to the

extent that, finally, the house search was conducted more than a year later than originally planned.

The new kind of object, temporally fragmented and extended, forces the authorities to try to synchronize their activities. However, this is not easy because the object is not a standard one but different in each investigation. Synchronization problems often emerge in economic crime investigation as the rhythms of different participants need to be merged into one investigation trajectory. Successful synchronization requires an increase in the negotiations across organizations—an expansion in the socio-spatial dimension.

Socio-Spatial Expansion of the Object in Economic Crime Investigation

The socio-spatial expansion of the object in economic crime investigation means that any participating actor needs to see the crime not as an entity in and of itself but as *an entity continuously constructed by the multiple investigating agencies.* The fact that the agencies participating in collaborative investigation processes are normally located physically far from each other does not facilitate this shift. The authorities have tried to resolve this problem and, at the same time, span the organizational boundaries by placing tax inspectors and enforcement officers as liaisons at police departments. It is expected that sharing a place will create a space for interaction that facilitates collaboration and makes it easier to find mutually accepted ways of working and synchrony between organizations.

In one of the cases we followed, the different orientations of the police and the tax office clashed despite the fact that a tax inspector (T1) was permanently located at the police department (Puonti, 2001a). In the starting phase of an investigation, the police emphasized the essential elements of the crime and finding of the evidence; the tax authorities emphasized the debiting of taxes. The police also seemed to emphasize the stake of the actual perpetrator, the actual owner of the investigated companies, and address the criminal liability toward him. They did not seem to be interested in the individual employees as much as the tax inspectors, who wanted to get the unpaid taxes from individual workers as well.

In this case, interestingly, it could be seen how the tax inspector also acted as a boundary spanner between the two authorities, attempting to facilitate collaboration between them. In the meetings, he supported both the police and the tax inspectors with his comments: he seemed to jump over the organizational boundary, back and forth if necessary. In the following example the role of the tax inspector (T1) as a boundary spanner in a meeting between police officers (P) and tax inspectors (T) stands out. During the meeting, the

police explained how ideal a situation it would be if the tax authority were able to make a report of an offense to empower the pre-trial investigation. The tax inspectors were skeptical and stressed the high threshold for making an offense report. Yet, in the following excerpt, which occurred a few minutes later, the tax inspector working at the police department (T1) anticipated erroneously the statement of another tax inspector (T2).

Excerpt 2

P1 So, based on the current knowledge, if you already can suspect . . .

P Yes that would be it.

P1 . . . something about the present [companies], that would be the best situation, that's what we'd like to have an estimation about.

T2 Preferably, preferably we'd like to have such information about the new companies so that we can immediately . . .

T1 Make a report of an offense, yes, report of an offense.

T2 . . . act on them. If we start to investigate the tails [old companies], well then, the further [back] we go, the harder it is to inspect [new] activities that are shifted elsewhere.

Here T1 seemed to try to support T2, but anticipated his thoughts erroneously. The anticipatory comment turned out to be an utterance that supported the police, not the tax inspector.

Often the attempts of boundary spanners remain individual, isolated attempts. It is difficult to actually span the boundary without tools that are more effective than mere speech. The obscurity and complexity of economic crime may require exceptionally efficient tools: common discursive tools such as those used in the meeting described above may work in other situations, but in this case they led to the formation of a splintered object of work. The police and the tax inspectors are in fact "the makers" of the crime during the investigation process—they become integral parts of the object they construct. To grasp this, they need a repertoire of self-reflective and dialogical instruments.

Toward a New Instrumentality of Economic Crime Investigation

When the object of work, the crime itself, is obscure and messy, it is often necessary to construct a representation of the object that one can concretely point to. The investigation process is also embodied in a vast influx of information, mainly paperwork. Compressing information in an easily conceivable form is a means of managing the information. One commonly used tool among the investigators is to turn the information into graphic form.

A graphic depiction used in white-collar crime investigation (Figure 7.3) translates thinking into the medium of a tangible artifact, a map, that is basically a manifestation of the socio-spatial relations within the object of work. Such a map serves to enhance communication and guide it toward relevant relations instead of irrelevant details.

Graphic depictions such as Figure 7.3 are normally drafted by an assistant and distributed to all participants. In this respect, they are different from many other kinds of models that are jointly constructed by the investigators or researchers themselves (Lynch, 1985). However, their construction and use are not standardized.

A graphic depiction was used in two out of the three cases we followed. In the first case, the main investigator told the interviewer that the case was so simple that no depictions were needed. In the second case, a depiction was produced by the tax office. Despite this, it was criticized by the tax inspectors for being unfinished and sketchy. It had practically no relevance in the investigation process. It was distributed to the participants but no shared use was observed.

In the third case, several types and versions of graphic representations were used to depict the case, the most important ones being charts showing the flow of money between companies and a time line of the life span of the numerous companies under investigation. These were included in the house search plan that was distributed to all participants and used in a variety of ways by them. In the interviews made after the house search, some stated that these graphic figures had been very important in finding out what the case was about, while others said that they already knew everything that was in them and that they did not need those depictions anymore.

The parallel model of economic crime investigation (recall Figure 7.2 above) is also a shift toward a project-like model of work. Planning the investigation is often a long, time-consuming phase that is not materialized in a clear form. The police officers we interviewed talked a lot about an investigation plan, but none of them was able to show one on paper. When asked about the investigation plan, some of the investigators showed us a plan ("notes" or "coordinates") made for the house search. Others told us that the plan was in their head, not on paper. No shared investigation plan was documented in the three cases followed. However, in all three cases, a partial plan (a house search plan) was made and distributed to all participating before the house search.

What makes planning in white-collar crime investigation difficult is that the crime is typically obscure, information is hard to gain, and new information may change the plans suddenly several times during the investigation. Thus, the plan should be flexible and enable quick changes.

Figure 7.3 **A 3–sized Graphic Depiction of a Network of CompaniesSuspected of White-Collar Crime**

Note: The figure illustrates the flow of money between the companies under suspicion. It was used in an actual economic crime case (names are blackened by the researcher for confidentiality).

The need for a more encompassing investigation plan and documentation of the decisions made was recognized in one of the cases followed. There was a misunderstanding between the tax inspectors and the police officers about the timing of the specifications to the tax inspection report. This frustrated the police. The police officers decided to adopt a new tool. First they started to take minutes of the meetings to avoid misunderstandings in the future. After acknowledging the different views of the police and the tax inspectors concerning the tax-inspection report, the police officer in charge formulated the task as follows.

> Excerpt 3
> [I]n the future, in the projects I lead, we'll keep a record of all the meetings between the authorities that are held in connection with an actual case, and all the participants will get a copy. That's how we'll make sure that everybody involved in the project knows what each and every person is committed to.

Finally, members of the unit designed a whole new document, a Project Plan. The Project Plan (Table 7.1) is a document that includes information on the general background of the case, goals, schedules, methods, division of labor, resources and risk analysis, and how the exchange of information is to be handled between the participants, the clients, and the media. One purpose of the plan was to facilitate collaboration between the authorities. Subsequently, the Project Plan was tested in real cases.

The Project Plan is a tool designed and used by practitioners in order to make visible and manage the temporal movement of the object. The project plan and the map of the object (such as that shown in Figure 7.3) are together a rudimentary new instrumentality for mastering the expanded object of economic crime investigation. What is interesting in this case is that both of these tools were constructed from the bottom up by practitioners involved in specific cases. In this case, the new representational tools were not so much drivers of change and groundbreakers for a new object. They were local adaptations to an object that had already expanded beyond the customary skills, tools, and interaction patterns of the practitioners.

Case 2: Mastering Crop Rotation in Organic Vegetable Farming

Environmental issues have increased public concern and support for alternative and sustainable agriculture, among which organic farming is an established and growing sector. The market expansion also favors organic agriculture in Europe and worldwide. However, learning organic farming is not easy. Many of the natural processes farmers are facing take longer to

Table 7.1

Project Plan Template Designed by a Police Unit

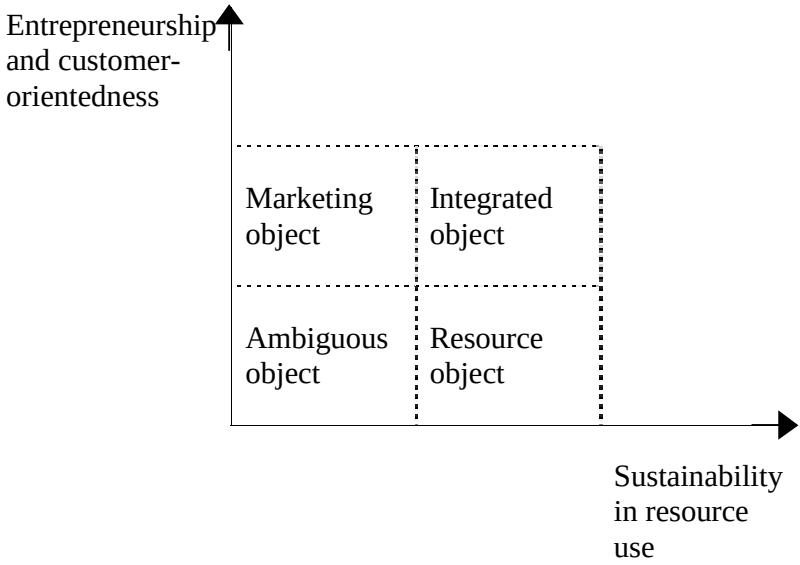
General information
Background of the case
Planning
Primary goals (e.g., business prohibition, getting the cases revealed during the investigation to be investigated, etc.)
Coordination
Schedule (starting the operations, proceeding, etc.)
Methods (intelligence methods, coercive means, tax inspections, etc.)
Division of labor between authorities/resources available (main investigators, inspectors, enforcement, officers in charge, who is doing what, who is involved in each phase, etc.)
Risk analysis
What can go wrong, how to avoid failures (taking the changing operational environment into account, failure of coordination, reaching people, making backups)
Flow of information
Exchange of information between authorities (contact persons, reachability)
Contacts between authorities and suspects
Contacts to the media (officer in charge responsible for the release of information, but communications are negotiated in order to gain best possible effect and right timing)
Feedback occasion (trying to learn collaboratively by reflecting on the experiences at the time of finishing the case)

Note: Translated into English by the authors.

deal with than the one-year production cycle, which is important in terms of marketing and economics. Organic nutrient mineralization, plant diseases, soil structure, and perennial weeds are examples of these natural processes. In organic farming, where synthetic pesticides and industrialized fertilizers are not used, a long-term time perspective is needed for production management. The concept of sustainability, often present in actual debates on the use of natural resources, implicitly contains the time dimension.

The object of an activity is historically formed and situationally reconstructed. To understand the changing object of organic vegetable farming, two historical dimensions are helpful, namely (1) "entrepreneurship and customer-orientedness," and (2) "sustainability in resource use" (Seppänen, 2002). With the help of these two dimensions, four types of objects in organic farming may be identified (Figure 7.4).

Figure 7.4 **Four Types of Object Construction in Organic Vegetable Farming**



1. The ambiguous object is represented by farmers oriented neither toward sustainable use of natural resources nor toward customers. The time dimension in their planning is short, consisting mainly of the one-year productional cycle.
2. The resource object is represented by farmers mainly concerned about the maintenance and improvement of natural resources, such as soil fertility. Crop rotation is considered as an essential element in this. A prolonged time perspective, important in planning and implementing crop rotation, corresponds to the old peasant time conception that spans over generations. The linkage of production to the market does not play an important role.
3. The marketing object is represented by farmers who emphasize economics and entrepreneurship. Customers and products are of importance to these farmers. The time perspective is short. Ecological uses of resources, such as crop rotation, are seen as limit marketing possibilities. In broad terms, the starting point of the Kola organic vegetable farm examined in the following account represents this type of object construction.
4. The integrated object is represented by farmers for whom the sustainability of resource use is not at odds with, but an integral part

of, marketing the products. Crop rotation brings continuity to production and quality to the products. The time perspective is long, allowing simultaneously quick actions in the short run. Here, the concept "organic" is of central importance, referring to the constitution of an organized whole between natural resources, farming, and consumers.

Temporal Expansion of the Object in Organic Farming

The temporal dimension in specialized agriculture varies according to type of production. Production of milk or beef, or perennial crops, proceeds in long cycles of various years, while chicken production and some forms of greenhouse growing have many production cycles per year. In arable farming, such as that of cereals or vegetables, a common productional unit is a growing season, starting in the spring with the sowing time and ending in the fall with harvesting and gaining the income from the yield. The necessary time perspective in organic farming was expressed by an advisor as follows.

> Excerpt 4
> An organic farmer must always look ahead over at least one year when choosing, for instance, crops for the next growing season, while in the conventional production, solutions can be made for one growing season only.

The key question for the farmer is: "What and how shall I (as a farmer) cultivate this year, so that I can succeed in farming in the coming years as well?" Part of the economic benefit that accumulates this year will be realized in later cash crop production years.

The following case data were collected at an organic vegetable farm, Kola, which earlier produced flowering annuals in greenhouses in a market- and business-oriented manner. While these features are also needed in the new activity of organic vegetable farming, the two forms of production differ in their temporal cyclicity and control of production. In the greenhouses, the Kolas had had three production seasons per year. The greenhouse plants were sown or planted and grown according to ready-made standardized procedures in the well-regulated conditions of the greenhouse. After selling the flowers, the greenhouse tables were cleaned, waiting empty until the next production season started again.

The new activity of the Kolas, organic vegetable farming, is different. The cultivation techniques are not standardized because it is a new type of production and because organic farming techniques vary according to the local conditions of field and farm. The farm fields do not wait empty; they have a complex

life of their own that has to be anticipated. Therefore, organic vegetable production requires a time perspective covering many years and production seasons. And despite the anticipation, risks remain. Besides a long time perspective, improvisation and quick action are needed as well. The temporal expansion in organic farming is not only a linear extension of time: it also includes changes in short-term farming. The time dimension acquires a new quality.

The instrument that mediates the time dimension of organic farming is *crop rotation*. It is one of the major strategies in sustainable agriculture and organic farming (Altieri and Rosset, 1996: 11). In planning the crop rotation, a sequence of crops is formed that would benefit the yields and sustain the farming system. A successful crop rotation plan makes all the elements of the farming activity fit together. In crop rotation, the time dimension is combined with the localization of the fields through the activity of the farmers.

On organic farms without animal husbandry, crop rotations often include *green manures*. This means that nitrogen-fixing legumes, such as clover of vetch, are sown together with grasses for fertilization and soil improvement purposes. Green manures do not produce income in the year they are sown. Staying in the temporal frame of one year, spending land and resources for green manures does not make sense. The use of green manures becomes understandable only in the longer perspective, where growing them is turned into financial benefit during the next or later years. The long-term challenge is therefore present in fields with green manures. Green manures change the annual time perspective as well. Organic vegetable farmers have to allocate their time, taking care not only of changing conditions of vegetable fields but also of those of green manures in their everyday practice.

Crop rotation also has an institutional and administrative meaning. Having at least a five-year crop rotation plan, accepted by experts, is a precondition for passing inspection as an organic producer. All organic farms are inspected once a year during the growing season.

Toward a New Instrumentality in Organic Farming

For five years, the Kola enterprise produced both greenhouse flowers and organic vegetables. Greenhouse production was finished in 1997. The trajectory under analysis in this chapter, in 1998, was the first production season to depend economically on only organic vegetable farming. The Kolas wanted to cultivate larger acreages with vegetables than before, and therefore they needed a new crop rotation. This was constructed together with an advisor and one of the researchers in March 1998.

In the planning of the crop rotation, the advisor first mapped the state of the art of the Kola farming activity by asking questions about the machinery,

Table 7.2

Crop Sequence as a Representation of a Crop Rotation

1. Green manure
2. Green manure
3. Vegetables
4. Root vegetables
5. Green manure
6. Vegetables

hired labor, yield levels, income, and so forth. Then a new crop sequence was designed. The advisor argued for the benefits of perennial green manures, while the farmers preferred annual green manures and a larger acreage with vegetables. The outcome, a six-year crop rotation, was a compromise between these views (Table 7.2).

After this, the field plots were divided into six 'rotational turns' that corresponded to a six-year rotation sequence. This was meant to balance out, in the course of the years, the ratio between vegetables and green manure. A map of the fields was an important spatial tool in doing this (Figure 7.5).

After the rotational turns were done, the advisor entered the field plots and their acreages into an Excel spreadsheet, specifically designed by advisors in organic farming. The crops of the coming season of 1998 were planned in rough outline. Taking into consideration the history of each field, the rotation sequence was placed rather mechanically on each turn. The outcome of the planning meeting was a table that included all the field plots and their crops for the following five years (Table 7.3).

Unfortunately, the growing season of 1998 was extremely bad with too much rain. The Kolas had to work hard and got very tired. In the beginning of August during an organic inspection, the farmer walked through all the fields together with the inspector. Table 7.3, third column from the left, shows the route of the organic inspection. At the same time, it shows how the crop rotation, planned in March, was implemented in the fields.

To master the expanding object of organic farming, it is crucial that the farmers construct and conceptualize their crop rotation by crossing the borders of annual production seasons, either to the previous season or to the following year(s) (Seppänen and Koskimies, 2001). We may call this "farming across the years." The inspection discussion is not particularly good for showing the situated improvisation aspect of the time dimension of everyday farming practice. But it shows quite well to what extent and how the time perspective that extends beyond one year is put into words and dealt with (Table 7.4). The speech across the years, present in the inspection discussion, is part of the instrumentality in expanding the object.

Figure 7.5 **Map of Kola Fields Used in Planning the Crop Rotation**

In Table 7.4, columns B to D show the numbers of turns of talk where farming across the years appears. Column A represents speech about that particular growing season. For our analysis, the shaded columns B and C are most important as they represent turns of talk that deal with the management of the fields.

Column B represents those parts of the data where the boundary between years was crossed, but what happened in the past or will happen in the future was not linked with the ongoing growing season. A very common topic in

Table 7.3

Outcome of the Planning Simplified

Rotation turns	1997	1998	1999	2000	2001	2002
1.	Perennial green manure	Vegetables	Root vegetables	Annual green manure	Vegetables	Perennial green manure
2.	Root vegetables	Annual green manure	Vegetables	Perennial green manure	Perennial green manure	Vegetables
3.	Perennial green manure	Perennial green manure	Vegetables	Root vegetables	Annual green manure	Vegetables
4.	Vegetables/ greenmanure	Vegetables	Perennial green manure	Perennial green manure	Vegetables	Root vegetables
5.	Vegetables/ green manure	Vegetables	Annual green manure	Vegetables	Perennial green manure	Perennial green manure
6.	Vegetables	Perennial green manure	Perennial green manure	Vegetables	Annual green manure	Vegetables

Note: Crop rotation for the next five years for the fields of the Kola farm (the rented fields are in white, the farmers' own fields in gray boxes).
<<**AU: WHICH COLUMNS SHOULD BE SHADED?**>>

Table 7.4

Turns of Talk in the Organic Inspection Discussion on the Kola Farm, 1998

	Now	Speech across the years		
Place	A. Ongoing 1998	B. no link to "now"	C. With a link to "now"	D. Other than field management
1. Home	103			
2. On the way to the field	45		5	
Field 3: Carrot	174	11		1
Field 4: Carrot and red beet	99			
Field 5: Onion	103		30	
Field 6: Various	132			2
Field 7: Red clover and ryegrass	142	11	5	
Field 8: Berries	145	14	8	15
Field 9: Potato	171			
Field 10: Storage and packing hall	286			
11.On the way to hired fields	85	2		
Field 12: Potato and swede	66	9		
Field 13: Vetch and ryegrass	51	4	2	13
Field 14: Carrot	44	2		
Field 15: Leek and potato	66	4	2	
16. On the way to next field	90			
Field 17: Fallow	40		11	
Field 18: Red clover and timothy	35	11	9	
19.On the way home	217	3		9
20. Home 1,358	14		45	
Altogether 3,687 turns	3,525 turns 95.6%	85 turns 2.3%	72 turns 1.9%	85 turns 2.3%

this category was the preceding crop, either asked about by the inspector ("What was growing in this field last year?") or told about by the farmer. Often this was followed by the farmer's stating how the preceding crop grew or by a discussion of the fertilizing aspect of the crop.

Column C represents those pieces of data where the speech across years was indeed connected to the "now" situation of the growing season. Both the inspector and the farmer expressed these linkages, showing that farming across the years was actually being constructed, at least to some extent.

The nutrient questions especially were dealt with across the years. The nutrients were connected to plant growth and environmental administrative regulations. However, in other production issues, such as the weed couch grass, repeatedly addressed by the farmer, the annual boundaries were not crossed at all. It seems that the nutrients and their leaching were constructed as an important environmental and political question that rolled over other aspects of production, such as the weeds. Another topic across the years was

the crop sequence (recall Table 7.2), which appeared both as a list, detached from the fields, and as a temporal narrative about specific fields.

The need for a new Kola crop rotation plan made the Kolas contact an advisor from the local rural advisory center. Our data on the interactions between the farmers and the advisor clearly show that a crop rotation plan was not dictated either by the farmers or by the advisor. The new crop rotation plan was, most of all, the result of a common construction process between the farmers, an advisor, and the researcher.

After having checked the crop rotation plan, the advisor sent it back to the farmers and asked whether they wanted to change something in it. The Kolas did not want to change anything. So, in May 1998, the advisor sent the plan to the regional Rural Department office. All changes in crop rotation plans had to be submitted to Rural Departments within regional Employment and Economic Development Centers. The role of the Rural Department was to confirm all changes made to crop rotation plans (Heinonen and Kieksi, 1998).

Organic farming, in 1998, was entitled to special aid within the Finnish agri-environmental scheme. Therefore, it was bound to other regulations, especially to the agri-environmental scheme and to other subsidy programs as well. By the end of May, farmers were to fulfill an annual production plan in order to obtain either EU-level or national subsidies. The annual production plan included what crops were cultivated on each field plot, and what type of subsidy was applied for with regard to each field. According to the inspector of the Kola farm, production plans were to match to the long-term rotation plans. This was important from the point of view of subsidies. In May 1998, the Kolas made their annual production plan in accordance to the new crop rotation.

During the Kola inspection, the inspection documents were filled at home. First, the inspector wrote on document forms the actual crops in 1998 of each field plot. Later, she filled in the question on the inspection documents about the crop rotation (Table 7.3).

In September 1998, the inspection documents were presented at a meeting of an ‘organic board.’ Besides the Rural Department as a coordinator, the board consisted of representatives of farmers, advisors, the Union for Organic Farming, consumers’ association, the provincial state office (food control officer), and trade. Also, fourteen organic inspectors were present at the meeting. The Kolas needed the approval of the organic board to be able to sell their products with the organic label. The inspection document of the Kola farm did not have any notes on defects, and it was accepted without discussion.

The regulation in each of the subsidy programs, such as Common Agricultural Policy, agri-environmental scheme, and so on, are based on their

own logic. In practice, farmers have to coordinate all these different regulations in their farming activity. Because of the rainy summer in 1998, the Kolas also had to find out the rules for the compensation of crop failure. For the Kolas all this meant many open questions and uncertainty about what they were allowed to do in their fields. In the spring, the Kolas participated in an educational event organized by administrators for farmers about the subsidy schemes. In addition, many phone calls had to be made to local and regional agricultural offices during spring and summer. And despite all this, uncertainty remained about what was allowed or forbidden. An excerpt from the field notes clarifies this. The researcher had just returned from fields 13 and 14, and Maria Kola asked how they looked like.

> Excerpt 5
> Researcher: I would mow the dense couch grass in the northern part of field 14, in order to avoid seeding of the weeds and to weaken the couch grass at least a bit.
> Kai Kola: You could mow it with a field chopper, but do you need some sort of permission for that?
> Maria Kola: I do not want any inspector to stand here for the whole day, I don't agree with applying any permissions.
> Researcher: I don't know about permissions, I know what would be wise to do. . . .
> (Field note, July 30, 1998)

Excerpt 5 shows how uncertainty about administrative regulations prevented the Kolas from quickly acting according to the necessity in the field. In October 1998, there was another discussion about the couch grass problem, and about how to continue farming next year.

> Excerpt 6
> Maria: We have been thinking, then, we did sow the clover grass to [field 18], but the rotations will all be confused. We cannot follow them. After last summer. We have to get a permission for that. And most probably we will. . . .

Excerpt 6 demonstrates how Maria had started to see permission as means toward mastering crop rotation. Applying for permission was no longer something to be avoided at any cost. To the contrary, there was confidence in one's ability to use it: "And most probably we will." The crop rotation plan as a formal requirement forced the farmers to expand their object in terms of the social space of advisory and administrative agencies, rules, and subsidies.

Looking back at the four types of object construction depicted in Figure

7.4, we perhaps somewhat idealistically assumed that within the integrated object, "the concept 'organic' refers to the constitution of an organized whole between natural resources, farming, and consumers." In light of the analysis we just presented, it seems appropriate to say that on the road toward the integrated object, advisory and administrative agencies, rules, and subsidies will be woven into the farmers' construction of their object. At the same time, the bureaucracy around crop rotation plans may also become an obstacle to the farmers' learning to rely on their own experiences and flexibly replanning their own land use.

The instrumentality of crop rotation planning tools was not constructed by the practitioners; it was largely given from above, partly even as a formal administrative requirement. But the templates were turned into active tools in negotiations between the farmers, the advisor, and the researcher. In this sense, the representational tools played a quite decisive role in pulling the farmers into the unfamiliar terrain of temporal and socio-spatial expansion.

Case 3: Expansion of the Object in Medical Care for Chronic Patients with Multiple Illnesses

In 1999 in the city of Helsinki in Finland, 3.3 percent of medical patients used 49.3 percent of the city's annual health care expenditure and 15.5 percent of patients used 78.2 percent of the expenditure. The latter figure corresponds to the well-known 20/80 rule of thumb in health care—meaning that approximately 20 percent of the patients use approximately 80 percent of the resources (*Helsingin terveydenhuollon kuntaprofiili*, 2001: 37).

Many of those who use a large portion of resources are chronic patients with multiple illnesses. Their care is difficult to plan and keep under control, both for themselves and for their caregivers. They embody the fact that objects of medical work have changed dramatically after the Second World War. As infectious and parasitic diseases have increasingly come under control, the prevalence of chronic illnesses has increased. Chronic illnesses include cancers, cardiovascular illnesses, renal diseases, respiratory diseases, diabetes, arthritis, and severe allergies, among others. These illnesses require what Wiener, Fagerhaugh, Strauss, and Suczek (1984: 14) call "halfway technologies,," that is, medical interventions applied after the fact in an attempt to compensate for the incapacitating effects of disease whose course one is unable to do much about.

> That these illnesses cannot be "cured" but must be "managed" makes them different in many respects from acute illnesses, the model around which health care was traditionally built. A brief look at the salient qualities of

> chronic illness makes the differences apparent. Chronic illnesses are uncertain: their phases are unpredictable as to intensity, duration, and degree of incapacity. Chronic illnesses are episodic: acute flare-ups are followed by remissions, in many ways restricting a "normal" life. Chronic illnesses require large palliative efforts: symptomatic relief (from pain, dizziness, nausea, etc.) is often as necessary as the overall progress of treatment. Chronic illnesses are often multiple: long-term breakdown of one organ or physical system leads to involvement of others. One fact becomes obvious: halfway technologies are not only prolonging life but are stretching out the illness trajectories. By trajectories we mean not just the physical course of illness but all the work that patients, staff, and kin do to deal with the illness, and all the social/psychological consequences that encircle the illness course. . . ." (Wiener, Fagerhaugh, Strauss, and Suczek, 1984: 14–15)

One of the consequences is that patients move constantly between home and various caregivers.

> They cycle through the hospital, then go to the clinic or doctor's office, return home, go back to the hospital during acute episodes, and again back to their homes. The problems of coordinating the care given in the hospital, clinic, and home become immense. (Wiener, Fagerhaugh, Strauss, and Suczek, 1984: 15)

The authors conclude that the inability to cope with chronic illness stems largely from the "standard categorical-disease perspective" dominant in industrialized countries. This perspective directs public attention and allocation of funds to the fight against specific illnesses, such as heart disease, cancer, or HIV/AIDS. But it also feeds competition and fragmentation among health specialists and specialties, and diverts attention away from the organization of collaborative care around actual human beings typically suffering not just from a single, well-bounded disease but from a complex bundle of illnesses and symptoms (Wiener, Fagerhaugh, Strauss, and Suczek, 1984: 35)

A chronically ill patient typically becomes an object for a number of physicians, each viewing the patient from the perspective of his or her own specialty. Each specialty tends to assert the primacy of its own interest, and to lose its interest when the main responsibility is assigned to another specialty.

> Primary-care physicians . . . become the mediators between specialists. Since they are less specialized than the consultants, they are not likely to be able to assert their interest in the patient as a totality. Nor are they able to defend the interests of the patient in the face of more knowledgeable and prestigious specialists.

. . .

> This phenomenon within medicine is likely to result in what physicians call "Ping-Ponging" the patient. The patient is the Ping-Pong ball, and the players may be a group of specialists who bounce a patient from one to the other. They may hope that a satisfactory diagnosis will emerge that transcends the individual specialties of the collected assemblage of individuals and specialists. The injunction of colleagueship may result in all other consultants allowing one to "test" his diagnosis before the others, who will have their turn in due course. In the meantime, the effect of continuous tests, diagnostic procedures, and examinations may be as painful and as life threatening as the disease itself. (Bensman and Lilienfeld, 1991: 219)

The multiple nature of chronic illness further complicates the issue.

> The plurality of specialists are all likely to be attracted to the symptom or condition that takes on a primacy because of their own specialty. And so multiple and often conflicting treatments are prescribed. The drugs used may also counteract one another, or produce negative synergistic effects. (Bensman and Lilienfeld, 1991: 220)

The following analysis is based on an ongoing longitudinal intervention study aimed at constructing a collaborative and negotiated practices of care between primary care and specialized hospital care in the city of Helsinki (see Engeström, Engeström, and Vähäaho, 1999; Engeström, in press; <<**update?**>> Kerosuo, 2001).

Temporal Expansion of the Object in the Care of Chronic Patients with Multiple Illnesses

The traditional object of medical work, as it is practically defined and bounded both in hospitals and in primary care, is the patient visit or "care episode." In other words, the object is temporally and socio-spatially bounded to a single continuous episode or encounter of physical presence of the patient. Administratively, such a unit has been reasonably easy to standardize. With the increasing prominence of multiple chronic illness requiring long-term continuity of care, however, this unit is breaking down.

In our project in Helsinki, we conduct so-called laboratory sessions with practitioners from both primary care and specialized hospital care, each session centered on a particular chronic patient who is also present in the session. For each session, one of the physicians engaged in the care of the patient prepares a preliminary analysis of the problems and possible solutions in the joint management of the patient's care, to be presented at the laboratory

session. For such analyses, the physician is asked to discuss with the patient and with other caregivers possible gaps and miscoordinations of care, using past patient records as reference. The expansion of the temporal dimension of the object regularly comes up.

For the first laboratory session in 2001, a chief physician of rheumatology at the university hospital prepared the analysis of a patient case. At the session, the physician reported on the analysis.

> Excerpt 7
> Laboratory session #1, 2001
> Chief rheumatologist: When we discussed with Lisa [the primary care general practitioner responsible for the patient] there at the primary care health center, then—and it shows of course in the patient records, it does not say that medication has been changed, the dosage of M [name of medication] has been increased, no information about that has been sent to the health center. And one can think that of course it should be sent. But no, that is not done. And probably nobody among us there is completely free of this sin. That for me is perhaps the biggest issue. Because this has been repeated many times over the years, that medication has actually been changed or something like that, which without question, when I now begin to look at it, plain common sense says that a copy of the patient record should in this case be sent to the patient's primary care personal physician. But it has not been sent, and a number of these occurrences have accumulated.

The crucial point in excerpt 7 is the expression "Because this has been repeated *many times over the years,* that medication has actually been changed or something like that. . . " The preparation of the analysis for the laboratory session forced the physician to expand the time perspective on the patient's care trajectory and led to a critical revelation. Here the time perspective expanded into the past. A little later in the laboratory session, an expansion into the future was expressed.

> Excerpt 8
> Laboratory session #1, 2001
> Primary care administrator physician: Even though I am a representative of primary care, I still think that specialized hospital care really doesn't necessarily have to do all these things over such a long duration, particularly because the Helsinki health centers do have their own outpatient clinics and systems both for the distribution of aid equipment and with regard to rehabilitation.

The administrator physician was expressing her worry about patients becoming tied to specialized hospital care for long periods, without any end in

sight. Her point was that the specialized care "doesn't necessarily have to do all these things *over such a long duration*," implying that specialized care should involve primary care in long-term care plans for chronic patients such as the one discussed in the session.

Socio-Spatial Expansion of the Object in the Care of Chronic Patients with Multiple Illnesses

The patient visit or care episode as a traditional way of bounding the object of medical care compresses the patient and the illness into the spatially closed box of what happens and is observed inside the walls of the doctor's office or the clinic. As chronic patients increasingly drift between multiple caregiver locations, the closed notion of the object breaks down.

This is regularly witnessed as the physician conducts the analysis of a patient case. To understand the patient's care, the physician has to seek out the different caregivers who contribute to the care trajectory. The chief rheumatology physician discussed above realized that he had to seek out and meet the patient's primary care general practitioner if he wanted to understand the whole picture of the patient's care. Thus, he took the highly unusual step of physically transporting himself from his hospital clinic to the primary care health center to visit the general practitioner. A member of our research group interviewed the two physicians on the spot immediately after their meeting.

> Excerpt 9
> Interview at the health center in preparation for laboratory session #1, 2001
> Researcher: Well, what did you have in mind primarily, what did you want to clarify here?
> Chief rheumatologist: Specifically this patient's care relationship with the health center, about which I don't know very much. There are illnesses here for which the patient has been entirely in the care of the health center, and there are mentionings about them in there [in the patient records]. And we went through them, and we concluded that at least from my point of view it feels good, that this is the way it should be. Then we pondered this, which was already taken up in my meeting with the patient, this back injury and its care. And we decided that we will work it out, through here, and we will interview the patient in a bit more structured way. So we'll look into what it is all about.

The physician's point about back injury refers to a recent accident in which the patient fell and broke a vertebra. The injury was treated in a hospital emergency room but to the doctor's dismay, the patient was quickly released,

sent home, and directed to the rheumatology clinic for the continuation of care—without consulting with the rheumatologists. The identification and negotiated mending of such ruptures between spatially distributed caregivers is a central part of the socio-spatial expansion of the object in this case.

Toward a New Instrumentality in the Care of Chronic Patients with Multiple Illnesses

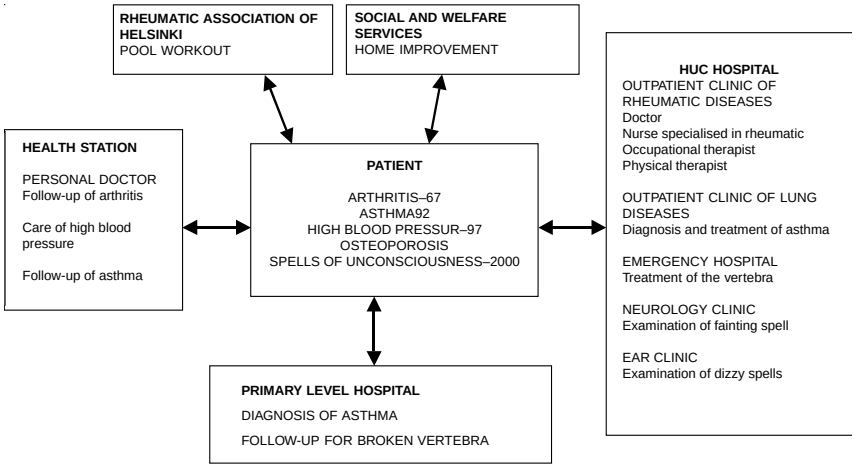
In the course of the laboratory meetings, the participating practitioners and our research group together designed new instruments aimed at facilitating the collaborative representation and negotiation of the patient's trajectory of care. The idea is that the new instruments are used jointly by the patient and the key caregivers.

To represent the most important caregiver connections of the patient, we constructed a one-page document called the *care map*. Figure 7.6 is a reproduction (translated into English) of the care map constructed by the chief rheumatologist in collaboration with the patient and the primary care general practitioner of the case discussed above. Figure 7.7 is a version of the same representation, constructed by the rheumatologist to point out the three crucial ruptures he had found in the coordination of the patient's care between the different caregivers.

At the laboratory session, the chief rheumatologist explained the third rupture in Figure 7.7 as follows.

> Excerpt 10
> Laboratory session #1, 2001
> Chief rheumatologist: Point three is such, like we heard on the video clip, this was the most inappropriate event. And as I understood it, this event happened such that as the vertebra was broken and a hard back pain ensued, and you [referring to the patient] were at the city emergency hospital, and they took the attitude that since there is nothing that can be surgically treated, they gave you a prescription for pain killers and told you that it'll probably heal by resting at home. But the pains were severe, and the patient could not manage at home. There was no home help service, and she had to come again. And then she was moved to the city's primary-level hospital and stayed there for some time for treatment. And I got such a strong feeling here that, as we continued to discuss this, and half a year had passed, that one could still clearly see that this matter caused a lot of anger. This was, if we think what does not work, this was the topmost issue from the recent years. I succeeded in meeting the surgeon who saw her [at the city emergency hospital]. But then the physician had changed in the middle of the care, which happens in emergency medicine, and another physician

Figure 7.6 **Care Map of a Patient, Presented by the Chief Fheumatologist**

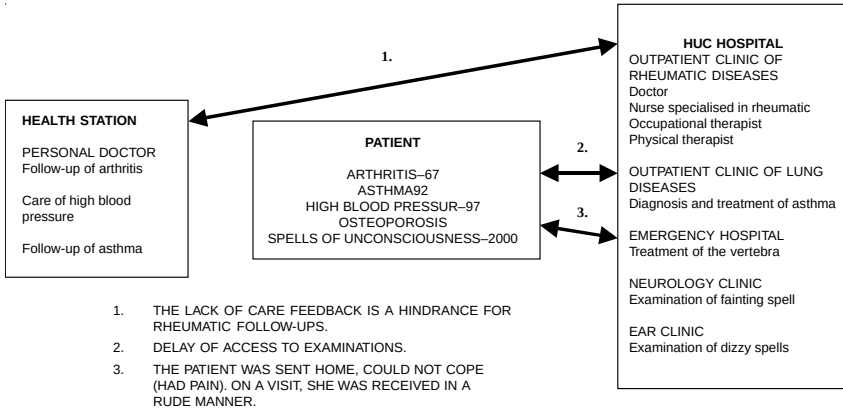


> was in charge of her til the end. And I was not able to meet this second physician, not even talk to him/her. And then those medical records did not in any way reveal [this], they gave the impression that everything went as it was supposed to.

Excerpt 10 demonstrates how a dialogical, negotiated construction of communicative representations of the patient's care led to the identification of serious gaps in the socio-spatial network of care (the patient characterized such a gap as "being in a void"). It also led to the temporally expansive realization that experiences of such gaps can have long-term effects: "and *half a year had passed*, that one could *still clearly see* that this matter caused a lot of anger." Finally, it led to the critical realization that existing official documentation of care can completely ignore such problems: "those medical records did not in any way reveal [this], they gave the impression that everything went as it was supposed to."

Along with the care maps shown in Figures 7.6 and 7.7, the practitioners found *care calendars* to be very useful instruments for dealing with the expanding object of their work. The care calendar basically lists in temporal order all the important past and current events and contacts in the patient's care trajectory. The events are listed in a condensed form, typically on one or two pages. But the condensed form is constructed and updated jointly by the patient and the physicians, aiming at a capturing not only events deemed significant from the official point of view but also those considered significant by the patient. An example of a care calendar, again produced by the

Figure 7.7 **Care Map with Ruptures of Care Coordination, Presented by the Chief Rheumatologist**



chief rheumatologist together with the patient and the general practitioner, is depicted in Table 7.5.

Neither the care map nor the care calendar was particularly complete or accurate in the form in which they were first presented by the chief rheumatologist at the laboratory session. Their point was to facilitate joint examination, remembering, interpretation, and revision, not to present some sort of an authorized true depiction of reality.

The instruments depicted in Figures 7.6 and 7.7 and Table 7.5 are not in themselves dramatically original or powerful representations. What is novel about them is that they were produced and meant to be used by all the key parties involved in the patient's care, including the patient herself. Thus, they became vehicles of critical reflection and joint planning.

In this case, the basic templates for the instruments were worked out by researchers and practitioners over a series of intervention sessions. As the templates were put into use and filled with content by practitioners, they were themselves molded and reconfigured to fit the particular case and circumstances. The practitioners test and twist these instruments as potential groundbreakers and spearheads toward grasping the temporally and spatially expanded object of care trajectory.

Conclusions

At the beginning of this chapter, we challenged the prevalent notion of the overwhelming compression of time and space in postmodernity, or new capitalism. Our claim is that compression appears as the sole dominant tendency

Table 7.5

Care Calendar of a Patient, Presented by the Chief Rheumatologist

Diagnosis or problem	Care contact
Rheumatoid arthritis, 1967	Helsinki University Central Hospital, 1997—Surgical Hospital; several rheumatic orthopedic operations, including wrist arthrodeses fusion and left hip arthroplasty
Hypertension, 1997	Care and follow-up at patient's own primary care health center
Spell of unconsciousness, June 2000	Helsinki University Central Hospital's Neurology Clinic, 2000
Osteoporosis vertebra fracture	City Emergency Hospital, June 2000
Asthma	Outpatient clinic for pulmonary disease, continuation of care at patient's own primary care health center

only when one fails to examine carefully what is happening in and around the objects of work. In Table 7.6, we summarize our findings concerning the transformation of the object in the three cases examined above.

When we talk about the object, we need to distinguish between the generalized object of the historically evolving activity system (compare G.H. Mead's [1934] "generalized other") and the specific object as it appears to a particular subject, at a given moment, in a given action. The particular crime facing the police investigator, the particular fields and crops facing the farmers, the particular patient facing the physician here and now do not neatly fall into either the generalized category of the "old object" or that of the "new object" as defined in Table 7.6. The particular, situationally constructed objects are unstable mixtures and partial manifestations of the generalized objects.

Objects do not appear, take shape, and become stabilized without instrumentalities. It is curious that in much of the recent work on objects (e.g., Knorr-Cetina, 1997) there is very little talk about instruments. Correspondingly, recent work on the evolution of cognitive instrumentalities (e.g., Renfrew and Scarre, 1998) tends to omit the objects on which instruments are used and which give rise to the instruments in the first place.

The notion of expansion is crucial to our argument (Engeström, 1987). We distinguish expansion from mere quantitative increase or extension. For us, expansion is qualitative transformation and reorganization of the object.

Table 7.6

Transformation of the Object in the Three Cases

	Old object	New object	Spatial expansion	Temporal expansion	Examples of emerging instrumentality
Case 1	Economic crime treated as single-act mass crime	Ongoing economic crime that contains multiple acts	Multiple locations of crime, multiple agencies	Long-term crime, long-term parallel investigation	Map of flow of money between companies; project plan
Case 2	Marketing object; one growing season	Integrated object; multiple seasons	Fields with green manures; advisory	Farming across the years	Crop rotation plan; speech across the years
Case 3	Patient visit or care episode	Trajectory of care	Multiple inter-connected caregivers	Multiple years of care, past and future	Care map; care calendar

On the other hand, expansion does not imply an abrupt break with the past or a once-and-for-all replacement of the existing object with a totally new one. Expansion both transcends and retains previous layers of the object. Expansion is not limited to the dimensions of time and space. It opens up and problematizes also the ideological-ethical dimension of power and responsibility and the systemic-developmental dimension that connects individual everyday actions to collective and historical transformations (see Engeström, 2001; Hasu, 2000).

But how do we explain simultaneous compression and expansion? It is useful to think of development in terms of multiple, partially interconnected, partially independent timelines (Scribner, 1985). Hutchins (1995, p. 372) presents this idea with the help of a cube. The cube is a moment of human practice. In the cube, three divergent timelines cross each other: the relatively "slowly" progressing historical development of the practice, the somewhat more dense development of the individual practitioners, and the very dense moment-by-moment progression of the conduct of the activity. If we take the point of view of an individual in his or her career among and through multiple practices, compression of time and space is obvious. If we take the point of view of a given collective practice in its historical evolution, we see lots of recent indications of expansion of objects.

In other words, the question is: How do individuals experiencing compression in their careers grasp and deal with expansion of objects in collective practices? This question is more interesting and less pessimistic than lamenting compression or searching for enclaves where compression has not yet hit.

The temporal expansion of objects in our three cases seems to call for a remediation of the long-term and the instantaneous. The investigators of economic crimes, the organic farmers, and the medical practitioners and their chronic patients were all in the process of combining long-term planning and quick reacting to poorly predictable changes and contingencies in the lives of their objects. In each case, the practitioners had to construct plans and historical records that represented events spanning several years in time. But the trajectories of their objects also included surprise moves and emergencies. In musical terminology, with expanding objects, time needs to be both *composed* and *improvised* (on improvisation, see Barrett, 1998; Weick, 1998). While improvisation is quick, it is above all *rhythmically focused.* As Kessler, Bierly, and Gopalakrishnan (2001) and Leifer, O'Connoer, and Rice (2001) show, it is crucial to distinguish between rhythmically focused speed and mechanically forced haste.

The socio-spatial expansion of objects in our three cases seems to call for a remediation of place and space. The space of information flows needs to be

crossed by means of concrete *trails* between places (for the concept of trails, see Cussins, 1992). When tax inspectors and enforcement officers are placed as liaisons at police departments (such as tax inspector T1 in excerpt 2), they make trails between local agencies. The same is true of the organic farmers participating in educational events organized by administrators for farmers about the subsidy schemes or making phone calls to local and regional agricultural offices. And it certainly applies to the chief rheumatologist making a visit to the primary care health center, as well as to the rheumatologist, the primary care general practitioner, and the patient attending a laboratory meeting.

In all these cases, there were flesh-and-blood human subjects moving in space from one place to another and establishing trails that could be followed again, both by those subjects and others. Trails make an *emergent knowable terrain,* as if built from below. In the midst of all the fuzz about boundless spaces of flows, perhaps it is time to look closely at the formation of such terrains.

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