Logical Structure of Explaining the Nature of City Planning:
A Theoretical Speculation

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Abstract:

This paper tries to develop some theoretical and abstract discussions about the nature of city planning in general. Our basic hypotheses here are that city planning is a kind of social technology which is coupled with planning technology and physical planning and that these three concepts are basically independent from each other.

Having said so, the next thing to do is to explain what these key concepts of 'social technology', 'planning technology' and 'physical planning' are, and what the relationships among them are in order to build up the total logical image of the concept of city planning. By doing so, we may be able to systematically explain the nature of city planning and present a hypothetical framework of city planning, which is the purpose of this paper.

The content of this paper is like this. Following the introductory chapter 1, the three key concepts of social technology（chapter 2）, planning technology（chapter 3）and physical planning（chapter 4）will be discussed, followed by the concluding remarks.

Keywords:

logical structure, social technology, planning technology, physical planning, rationality

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1. introduction

In order to have good planning for the mega-city, what would be needed for us to do and study? The answer seems to have two aspects. We need:（1） to understand the mega-city properly as the matter of 'object' of planning and（2） to manage the planning system properly as the mater of 'method' of maga-city planning. This paper is related with the latter methodological aspect and tries to develop some theoretical and abstract discussions about the nature of city planning in general.

We start with a very fundamental and crucial question to all the planners: "What is such a planning system, or more generally, what is city planning?"[1] This is a question which asks for a proper explanation about the essential nature of city planning. In fact, this is so difficult a question to answer that it may stay unanswered as an everlasting mystery. But I would like to challenge to answer this question.

Usually, to explain 'city planning' is equal to describe various attributes of 'city planning' just like: "City planning is so and so..." But these attributes can be chosen on ad-hoc bases, which may make the explanation look rather arbitrary and unconvincing. Here, I propose to choose the attributes on a systematic way that may properly reflect the structure of city planning itself. Then we come to the question: "What is the logical structure of city planning?"

Obviously, the right answer needs the right approach to the question. Because there is not the only one right approach, there can be many answers of different degrees of certainty. This paper should be understood as one of these possible answers.

Our basic hypotheses here are that city planning is a kind of social technology which is coupled with planning technology and physical planning and that these three concepts are basically independent from each other. Having said so, the next thing to do is to explain what these key concepts of 'social technology', 'planning technology' and 'physical planning' are, and what the relationships among them are in order to build up the total logical image of the concept of city planning. By doing so, we may be able to systematically describe the nature of city planning and present a hypothetical framework of city planning, which is the purpose of this paper.

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2. Social Technology

2.1. Technology

Before getting into detailed discussion about social technology, we have to briefly look at the overall picture of technology at large. Technology, as we all know, is a kind of human action. But what kind? The human action is traditionally classified into three categories according to the values we pursue through them, namely truth, good and beauty.

Truth is the value that science pursues and beauty is what art pursues. Good, however, is pursued both by morality and technology, where morality pursues ethical values and technology pursues technological values, namely, private profits and/or public interests（as in city planning）.[2]

So the basic nature of technology is not knowing（like science） nor enjoying（like art） but doing --- Doing in order to attain some values effectively. So technology naturally seeks for efficiency, and there we can see a kind of rationality built in itself. We may call such born rationality as 'efficiency rationality.'

Technology can be defined as the process and method for the individual or social group（as actor）to manipulate the natural or artificial system（as object）in a certain way（as means）in order to pursue the achieve the technological value（as end）. So technology has such crucial elements as the actor, object, means and end, which are also important elements in the structure of city planning as a kind of social technology.

2.2. Social Technology

In the modern society, technology has been coupled with science, forming scientific technology. When it is applied to social matters like urban problems, we call it 'social technology,' where the actors are social groups who manipulate social systems（like cities）.

Such technology can be accepted and supported by the society only if it has reliability and certainty, which means it had to seek for 'rationality' depending upon scientific knowledge. Thus, 'scientific rationality' has become indispensable element of social technology.[(3)]

2.3. Logical Structure of Scientific Rationality

Then, what is the logical structure of scientific rationality? In the core of scientific knowledge, lies the 'law of cause and effect'（hereafter, 'causal law'）, which assures that a certain cause will bring a certain effect. By utilizing this law, people work upon the cause（means）that will surely bring the effect（end）which they want. This process of transforming the cause-effect relationship into the means-end relationship is the logical structure of scientific rationality.[(4)]

In the practicing spot of social technology, however, the actual situation is often quite away from this model, creating problems:

（1）The causal law concerning social phenomena is often complex and stochastic and less certain and reliable than that of natural phenomena. And yet, unless we abandon social technology and make decisions on arbitrary basis, we have to accept the causal law with full understanding of its limitations. The point here is not if we accept social technology or not, but which less arbitrary cases we accept. In reality, this choice is made in political context.

（2）The end is the essential element of social technology but is very difficult to identify especially in the value pluralistic society. So one of the most difficult practical problems there is how to come to the agreement among the actors involved. Again this is a matter of political decision.

（3）The means to attain the end requires various kinds of resources, which are often scarce in the society concerned. In the case of city planning, they are either the government money（for provision of public infrastructure）which is a financial matter, or the restriction of freedom in the private sector（for land use control）which is a political matter.

"How much social costs should be borne by people in order to attain how much social benefits? --- And under such an uncertain causal law?" This is the severe political question which lies in the core of social technology. All these limitations of social technology is observed in the case of city planning as well.

2.4. Actors of Social Technology

In the modern society, social technology is carried out mainly in and by the market and government. Then, how can we provide the logical framework for it?

Let us think of the social system which provides and supplies commodities and services at

the societal scale. We note there are private and public actors on the one hand and private and public ends on the other hand. Crossing them each other, we can have four logical possibilities:

（1） Private actors working for private benefit;
（2） Private actors working for public benefit;
（3） Public actors working for private benefit; and
（4） Public actors working for public benefit.

Now it is clear that what above actors typically correspond to are:

（1） For-profit companies working in the market sector;
（2） Non-profit organizations（NPOs）, non-governmental organizations（NGOs） or similar citizen activity groups working in the 'voluntary sector'; and[(5)]
（4） Governments at the central, regional and local levels and their subsidiaries including public corporations working with specific official powers under control of the legal system. But it should be noted that the case（3） cannot not exist theoretically.[(6)]

This framework will give us a good picture for the current practice of city planning in Japan. The case（4） corresponds to the government activities of city planning and（1） to the market activities in urban and real estate development as business.

The case（2） can be understood as corresponding typically to Machizukuri（people's community building） activities. It is interesting to note that Machizukuri is 'private' activities which aim at certain 'public' interest. And the question of what is 'public interest' is answered by the Machizukuri workers who are basically 'private' people.

3. Planning Technology

3.1. Planning As Human Action

"What is planning?" This is another big question, which has lain in the root of city planning and yet has been often neglected and left unanswered. One of the very few precedent research results includes our previous paper（2011）: "Some Preliminary Discussion about the Logical Structure of Planning and the Plan: Focusing upon the Plan-Use Phase," [1)] which will provide the theoretical basis for this chapter.[(7)]

Our picture of 'planning' is like this.[(8)] When we find some problems or possibilities in future, we may ask ourselves: "In order to act properly for them, what should we do NOW?" This is really the starting point of our action toward planning. If we go far enough beyond the phase of just worrying about, or hoping for, the future situation and reach the phase of making some decision to act properly now, we consider this as the action of planning. Based upon this picture, we would argue that planning is the human action that is intentionally made as the proper preparation for the corresponding future action.

So the concept of planning has, as the two indispensable elements, the future action and the corresponding present action, which form the 'two-tier' system of human action. But this is the most simplified picture. And in a more complicated picture, there can be the 'multi-tier' system of human action, which we will not get into further.

Time is the indispensable element coming into the concept of planning. Planning is human action trying to act rationally both at present and in future within the framework of a supposed time-span. So rationality, or more precisely what may be called 'time-rationality,' is inherited at the birth of planning.

3.2. Planning As Social Technology

In the picture above, the present action ends up with the decision for the future action. The content of the decision may or may not expressed or recorded. Here, the logic of social technology requires that it should be recorded in the form of document so that it can be identified openly and objectively by the people concerned. We call such a document PLAN, which can take various form and content. Naturally, making the plan is a very crucial element of planning technology, often requiring professional skills, although planning technology includes some other important elements as well, as discussed later.

Social technology also brings into planning the concept of 'causal rationality' in the way that the causal law is extended to include the time dimension so that the law assures that a certain cause（means）at present will bring a certain effect（end）in future.[9]

3.3. Logical Structure of the Plan

Now we come to the phase of looking at the logical structure of the plan closely. We classify the plan according to its style into two categories:

（1）The 'simple style' plan like the plan for building a house, where the future action as a whole may be considered as a single project whose total picture can be roughly imagined at the time of plan-making[10]; and (2) The 'complex style' plan like the master plan which guides the future action of many projects which are often not imagined at the time of plan-making. From now on, the discussion about the latter type follows.

The 'complex style' plan must provide a range of allowance to the user for the future actions because they may take so varied form or style that the plan cannot specify all of them in details at the time of plan-making. Therefore, the plan has to be expressed in an abstract way so that it may be able to serve as the norm to future concrete action. Then, what will be the logical structure of such a plan?

The plan is not a map nor diagram, but is a set of sentences which form a logically interrelated structure as a whole. Each sentence represents a policy of different degrees of abstraction, meaning an action of 'doing something.' Such a logical structure can take various forms but, for the matter of convenience, we would like to imagine the simple 'tree structure' with a clear hierarchy, preferring to the sophisticated 'network' or 'cluster structure.'

In such a hierarchical structure, the upper-level abstract policy is related with the lower-level less abstract policy(ies) in the end-means relationship. This makes the plan as a whole an 'end-means rational' entity.[11]

3.4. Plan-Making

Based upon the above picture, we can say that plan-making is a process of making such a logical structure from nothing. It is a very important part of planning technology to which much of planners' efforts are devoted. As there is much information about the technical know-how of plan-making, we do not need to get into its logical structure any further.

3.5. Plan-Use

Once a plan is made (and usually officially approved) and is ready to be used, a new phase starts which we call 'plan-use.' But what is the real meaning of use of the plan, or what are the actions taken in plan-use? Amazingly enough, this is the planning phase that has received rather

little consideration in both practice and research of city planning. So we have to clarify the logical structure of plan-use.

Let us imagine a city planning situation that, after the master plan is made, an urban development project is proposed which requires the official judgement for approval, rejection or something else based upon the master plan. We argue that the core of plan-use is to check the proposal against the master plan, which we call 'collation.'[(12)] There are four steps in plan-collation as follows:

(1) Identification: The proposed project is examined and identified if it is a legitimate proposal with clear content expression;

(2) Contraposition: The content expression of the project is put side by side against the relevant policy statement of the plan;

(3) Check: The project is then checked like: "Is it materially in accordance with the relevant policy statement?" This is probably the most crucial and difficult technical phase of the entire collation process;[(13)] and

(4) Judgement: As the result, the proposed project is now judged whether it is: (a) 'approved' without any conditions; (b) 'approved' with some conditions; or (c) 'rejected.' When the project is approved, there can be two cases of: (d) the project approved with the master plan unchanged and (e) the one with the master plan partial amendment.

The case of (e) means the possibility that the master plan be amended due to the proposed project, which is not usually practiced in the actual situation.[(14)] What this rule allows is partial amendment of the plan although almost all the master plans, in reality, do not allow this rule. It is now clear that plan-use can be a very dynamic process where both the plan and proposals may be changed by interfering the other.

3.6. Plan-Implementation

The approved project is expected to be implemented in due course of time but, in reality, it may not be implemented for various operational reasons. This means that, once a project is approved, the phase of plan-use is finished as far as the project is concerned. And the next phase of plan-implementation with its own logic starts, which I do not discuss further in this paper.

3.7. Plan-Amendment

So far we have discussed, within the framework of the 'complex plan,' the case of a single proposed project, but from now on we assume that similar proposals will come up one after another. Then a question follows: "How long can the original plan, with minor amendments or not, be used? This is the question concerning the 'life span' of the plan.

The answer seems to be: "As long as it can serve as the norm for those many future actions." And when it becomes unable to serve as the norm, it is time for the plan to go through the major amendment. Thus, the 'complex style' plan like the master plan would stay for very long, or even for ever, with continuous major amendments.[(15)]

Once the decision is made that the existing plan should be totally amended, a series of action starts with exactly the same logic to plan-making but with far richer information and better value judgement than before, thanks to the experience of the preceding plan-use.

3.8. Management System of Planning

Thus, the plan goes through the phases of plan-making, plan-use, plan-amendment minor or major in its life span. All these phases need highly professional skills and constitute the element of planning technology.

This also implies importance of the institutional setting which manages the entire planning process as described and which improves planning technology through the accumulation of planning practice.

4. Physical Planning

Now we come to explain the object, means and end of physical planning. The discussion here is mostly based upon the planning history in USA, where the concept of physical planning was developed.[16]

4.1. Object of Physical Planning

Since its formative days, city planning has been concerned about the 'city' in a rather unique way. It has not dealt with the city as a whole but with a particular aspect of it, namely, buildings and infrastructure. It is because the professionals who developed city planning technology were mostly architects, civil engineers and landscape architects. They called it 'physical planning.'[17] Their concern, however, soon shifted from facilities like buildings, streets and parks to the more general concept of 'land use.' They perceived the city roughly as the combination of residential, commercial and industrial uses.

Then, what is land use? The concept of land use has three main elements: land, facility and people. The basic picture is like this: the city is made up with many pieces of land upon which the facility is developed and people use it for various particular purposes.[18] So land us can be understood as people's use of land via the facility.[19] This creates two relations: (1) land-facility relation and (2) facility-person relation.[20]

Physical planning primarily tries to manipulate the land-facility relation in terms of the facility's type, location, size and shape, for instance, through zoning regulations. The control of the facility-person relation is also made only when it is necessary. A good example is that the change of facility use (i.e. from residential to industrial), which is considered as the change of land use, is also the object of regulation.

The concept of land use is concerned basically about the way land is used and not the way it is owned. But in reality, there is a close connection between the use and ownership of land for practical reasons. As is known, such facility as urban infrastructure better or exclusively functions under public ownership. So, very roughly speaking, the physical city is conceived as the combination of urban infrastructure on the public land and other facilities on private (and public) land.

4.2. Means of Physical Planning

As the means of physical planning in the market economy, the government has developed three key planning methods: namely, the project, regulation and plan.

(1) The project is the method by which government builds public facilities on publicly owned land, which can be considered as government's direct intervention into market.

(2) The regulation is the method by which government regulates private actors who build private facilities on privately owned land, which can be considered as government's indirect intervention

into market.

(3) The plan is the method by which government provides the rational and legal base for justifying the above two methods, which can be considered as government's indirect guidance of market. Here comes planning technology, which is the real base for the means of physical planning as social technology.

4.3. End of Physical Planning

Physical planning did attain effectively some ends of its own, which were directly related to the physical ends such as: 'prevention of overcrowded living conditions,' 'prevention of mixed land uses,' 'provision of infrastructure,' etc.

The concept of land use control was gradually expanded toward the management of the quality of the municipality's space at large. Especially after the war, land use control was accepted as a very effective tool for the municipal management. The municipality has found that, through the control of land use, it can control its financial, social and environmental problems, at least, to some degree.

Land use control became an indispensable administrative tool and now occupies the central position of the municipality. As a result, the former 'city planning' has also widened its function to include most of urban policy matters in general with relatively less emphasis upon physical aspect. (21)

5. Concluding Remarks

We have tried to presented a logical framework to explain the nature of city planning based upon the hypothesis that city planning is a kind of social technology which is coupled with planning technology and physical planning. As a whole, the discussion which is developed upon three key concepts of social technology, planning technology and physical planning seems to have no obvious fatal defects although there are still many points ignored or neglected.

Here, we should emphasize that the thus described image of city planning is still another hypothetical logical being and so needs to be empirically verified further. Then, what is its value? Or how can we evaluate such a hypothetical framework? The answer seemingly is that such a framework, as a logically consistent one, should be able to give us new productive ways of looking at the research and practice of city planning.

One of the possibilities would be the notion of 'rationality,' which we have encountered here and there in the structure of city planning. "How does the real content of rationality differ according to the actors, time-span, areal coverage etc.?" These sets of potentially productive new questions naturally follow. Surely the concept of rationality will be one of the most crucial points in understanding the nature of city planning.

Notes:

(1) In this paper, we use the notion of 'city planning' rather broadly in order to include 'urban planning' and similar planning activities that most of us are professionally engaged in.

(2) Morality focuses the internal motivation or process of individual's actions whereas technology focuses the external product of people's actions. Interestingly, technology is one of the twin brothers of morality as far as the values they pursue are concerned. More interestingly, morality focuses the human 'norm' which technology in general does not focuses much, but the norm for the future action, which is the plan, occupies the central core of planning technology, as we will discuss later.

(3) However, the original essential nature of technology is quite independent from science. Technology aims at attaining something by any means, including non-scientific method. Such examples include witch

doctor and praying ritual for rain etc.

(4) This can be expressed in symbolic logic as:

$$\frac{(x)\,(F(x) \supset G(x) \qquad F(a)}{G(a)}$$

Assuming that we know the cause F inevitably brings the effect G, if we choose F as the means, then we can attain G as the end.

(5) This sector is called in many ways as: community sector, non-profit sector, 'not-for-profit' sector, civic sector or social sector, all with slightly different nuance.

(6) But in reality, some of the government or its subsidiary bodies are often criticized as working for the interest of particular private groups in Japan.

(7) Other precedent research result that our paper refer to is Davidoff and Reiner (1962),[2] which is an American classic in planning theory.

(8) We have already discussed human action in the truth-good-beauty context, but now we look at it in the future-present context of time. Here, we simply believe that we have freedom in making both our future and present actions. An interesting contrast would be the case of corresponding human actions in the past-present context of time, which may include history, memory etc., where we have freedom in making only our present action.

(9) This can be expressed in symbolic logic as:

$$\frac{(x)\,(t)\,(F(x, t) \supset G(x, t) \qquad F(a, t_1)}{G(a, t_2)}$$

Assuming that we know the cause F always inevitably brings the effect G, if we choose F as the means now (t_1),then we can attain G as the end in future (t_2).

(10) The 'simple style' plan takes such form as the blueprint or program. The blueprint (for a house) is a document which precisely specifies a set of concrete actions in terms of the choice of space, materials and so on for its user. Similarly, the program (for a meeting) specifies a set of future actions in terms of a precise time sequence. In neither case, the user is allowed to act differently from the specifications. And the plan's end product (a house or meeting) which was created by different users of the plan is expected to come out as the same one.

(11) The end-means relationship within the plan can be extended to the one between the upper-level and lower-level plans. In Japan, there are many government plans at the national, regional, and municipal levels, which are legally prescribed to form a hierarchy as a whole with the above relationship. This system is expected to lead the government to make rational decisions in a phased way from the long-term larger-area level to short-term small-area level. This is another system for rational decision-making.[3]

(12) The current Japanese City Planning Act requires the lower-level plan be made in accordance with the upper-level plan (master plan) but does not specify the concept or preceding of collation. We argue that the statutory requirement of plan-collation will be one of the most effective strategies for advancing planning technology.

(13) One of the most serious problems in a real situation is that few of current master plans have the form (and content) which would stand up well to the whole process of plan-collation. Although they are often thick beautiful documents with many illustrations, they are, as a whole, made up of a series of sentences of an unclear, sometimes logically incompatible, structure with ambiguous meanings. As a matter of plan-making technology, there seems to be a great need to improve the form, more than the content, of the master plan.

(14) This means a possible rule that the existing higher-level policy may be amended in order to incorporate at least partially the policy of lower-level proposal. To accept this rule or not is a matter of political decision, but it may bring more flexibility in planning practice.

(15) In the case of the 'simple style' plan, in contrast, once the project whose total picture is imagined at the time of plan-making is implemented or abandoned, the plan is no more needed. So the plan's life span is limited.

(16) This chapter is partially based our precedent paper.[4]

(17) The word 'physical' was also used in a peculiar way, not as ordinarily meaning 'of body' or 'of physics' but as meaning 'of facility', 'of land use' or 'of space.'

(18) So we naturally come to the question of: "What is the unit of land use?" and then inevitably to the questions of 'lot' and 'block' all of which are the crucial elements of the physical city.

(19) Here the facility may not be the building but the space (including open space) that functions for the purpose of the people's activity.

(20) This is the way people use the facility in terms of time (i.e. business hours), intensity (i.e. number of users) etc.

(21) The name of 'city planning' has also drastically changed. Even pre-war days, 'city planning' was changed to 'urban planning' or 'community planning' which enabled to include planning in the suburban municipality. During the last several decades, the activity is mostly called 'planning.'

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