Concept Model "the Flow of Information in the City"

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Abstract

Various kinds of information are necessary for the planning and the management for the city. There are no concept models that mentioned the general structure of the information in the city. Besides, in the present world when much information overflows, no one describes that who should collect, accumulate, edit, provide and manage the information in the city by what kinds of methods. It is an urgent matter to clarify the general structure of the information in the city with consideration of each factor and to apply to the modern practice urban planning and management. In this paper, gathering information about the city is categorized into four types about how to gather information. Furthermore, the concept model, "Flow of Information in the City" is proposed and the environment of the information that is necessary for the modern planning management will be shown.

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1. Introduction

Many kinds of information are necessary for the planning and the management for the city. Goodchild(2007) described a civic role in a concept called "citizens as censors" about one of the various information, but there are no concept models which mentioned the general structure of the information in the city. Besides, in the present world when much information overflows, no one describes that who should collect, accumulate, edit, provide and manage the information in the city by what kinds of methods. It is an urgent matter to clarify the general structure of the information in the city with consideration of each factor and to apply to the modern practical urban planning and management. In this paper, to gather information about the city is categorized into four types about how to gather information. Furthermore, the concept model "Flow of Information in the City" is proposed and the environment of the information that is necessary for the modern planning management is shown.

In the section 2, the four following types about how to gather information are mentioned. a) Administrative investigation type, b) participation process type, c) SNS accumulation type, d) automatic logging type. These information types should be utilized usefully while supplementing it mutually in urban planning and management. The construction of the real administrative system about the information of the "Administrative investigation type" is not realized, but the need of an evaluation, the monitoring by the citizen and experts, and the data sharing by the meta-data utilization are pointed out. For the "Participation process type", many practices, for example the flag made with the town local information (Aiba et al. 2010) and PPGIS (Manabe et al. 2003, Poplin et al. 2013) are performed. However, in the present city where information of the various quantities and quality are mixed it is hard to say that these are utilized usefully in urban planning and management. For "SNS accumulation type" and "Automatic logging type", though they are used for many commercial marketing, even the beginning of the utilization cannot be found in our field. In the section 3, the important elements in "the Flow of Information in the City" are mentioned. They are the followings. 1) The purpose of the information circulating, 2) real information flow, 3) operators and the methods of administration for a database to accumulate the information, 4) the quality and quantity of the information, 5) the characteristic and the location of the sender and receiver, an editor, a manager and so on, 6) the range of information circulation, 7) a method of collection and the release of the information, 8) a method of editing and the visualization of the information, 9) the return of information to a sender and others, 10) the durability and cir-

culation of the flow of information, 11) re-utilization of the information by the users, 12) the supplement and the reinforcement by the real users in the real world. It is important to circulate the information to be necessary for the urban planning and management appropriately assuming these elements. In the section 4, four cases are introduced for examining of the flow of information in the city. These are Amippy, Toru-Shin, SeeClickFIx and DataSF.org. Finally, in the section 5, the two issues are mentioned as the conclusions of this paper. 1) Changes in the city life due to the flow of information in the city and 2) reaching points and challenges of "flow of information in the city".

2. Types of Gathering Information for City Planning and Management

In this section, types of gathering information are classified into four types and the characteristics and problems are mentioned. And ways of useful leverage of information in the city planning and city management are considered.

2.1 The Type of Gathering Information in the City

Administrative investigation type

A Japanese city planning basics survey is provided at the article 6th of the City Planning Act in Japan. The manuals about this basic investigation was made five times by the government from the old law era, these are interesting documents because the aspect of the city situation at the time were reflected to them. The newest city planning basics survey manual 2013 was devised in June 2013. In this, some survey contents were integrated, and some new investigation items such as "the location of large-scale pulling in customers facilities" and "the situation of the public transport" are required, and not limiting expanse of reference to the city planning area, a GIS database are stated. These city planning basics survey and the investigation in many cases of various actions programs by the government want to be named information gathered by the investigation of the administrative formula "administration investigation type". Although it is not yet been in the construction of reality administrative system for this type of information, the need for assessment and monitoring by the needs and citizens and experts of data sharing has been pointed out by the meta data utilization in the government.

Participation process type

On the other hand, in the participation process of urban planning and community development of practice, type of information that was different from above-mentioned - administrative investigation - type has been accumulated. There is no need to describe the significance of citizen participation in urban planning in this paper. One of its significance is that is an opportunity to get information to obtain to know the reason that it is citizens are living every day, so to speak information of citizens' sense rooted in life. As methods of participation, various workshops full of ideas are carried out, the outreach activities have become more polite and appropriate way, the efforts to try to the electronic internet of the process of participation are also seen, public participation is becoming to encourage participation broader citizens. In short, the collection of a wide range of information has come to be performed. This type information can be called as "participation process type".

SNS accumulation type

In addition, information and communication technology (ICT) is widespread. Information originated from individuals of social network services that are represented to Twitter, Facebook, Mixi and so on have been able to place that occur in large quantities. In the days that many people are using them on a daily basis to feel free, exchange of where the information can be a valuable source of information for urban planning and urban development that targets the everyday social life. This type information can be called as "SNS accumulation type".

Automatic logging type

Every time behaviors of individuals are (semi-) automatically recorded. This type of information has been used already useful in the commercial marketing. While SNS accumulation type information described above is information which is sent by their own intention, this information type is information that person is recorded via mobile devices such as smartphones without awareness has been accumulated, with in many cases they have a consent about recording. Spatial movement, position, many kinds of information related to the action as including such as purchasing behavior is automatically recorded. This type information can be called as "Automatic logging type".

Table 1. Four Types of Gathering Information

Type of Gathering Information	Summary
Administrative investigation type	Information to be collected by the official investigation of the administration. Including the urban planning basic survey and surveys that are investigated in various action programs
Participation process type	Information collected in the processes of participating citizens. Information of citizens' sense rooted in life is collected and stored.
SNS accumulation type	A large amount of electronic records information for the individual to communicate in everyday on the SNS.
Automatic logging type	Information about daily behavior that recorded (semi-) automatically via a mobile device such as smartphones.

2.2 How will the Variety of Information be able to use in Urban Planning and Management Efficiently?

How can we use such a variety of information in the city to urban planning, community development and urban management efficiently? Scenes of the utilization are two of the followings. The first thing is presented as a determination material and objective evidence at the time of planning and updating. And another is that used as an evaluation of the planning and practices.

As the decision material and objective evidence at the time of making and updating the plan, the administrative investigation type and participation process type has already been used in this phase. Rather they are the information for this. Since the urban planning, community development and urban management cannot be made by arithmetic calculations rely only on objective information automatically, the information should be used as a clear basis in determining. In addition, SNS accumulation type information and automatic logging type provide a judgment material and objective evidence at the time of planning as easy to grasp in a real

time about more extensive city. Obtaining and using such information has the potential to change even techniques and systems of planning, managing and updating themselves.

As the evaluation of the planning and practices, all type information should be taken advantaged useful. The problem is that it is often the opportunity to evaluate is not prepared. If it is difficult to assess by administrative government, all of the information should be published in manageable form. By doing so, evaluation by the privates is also possible easily because the citizens and the private sectors have the technology to analyze by this information.

Flooding a wide variety of information is the so-called "sea of information", current that could lead to be danced information. It is also a fact that mixed information of various qualities in SNS accumulation type information, automatic logging type and participation process type. However, the commercial marketing as described above has established a methodology for picking ball from "a mixture of wheat and chaff" from necessity and usefulness. In the urban planning, urban development and management, these challenges have been to avoid.

It is necessary to establish the intention to application variety of information to urban planning and management, the methods of managing them, and techniques and institutional framework to accept them to process. As mentioned earlier, the change in the information surrounding these cities are those that have the potential to alter even the structure of the techniques and systems of urban planning. Planning and management system that can examine the flexible cities embedded to be processed to obtain the information appropriately as the basis and evaluation for plan making and management should be considered, assuming the situation in that the various information has been gathered easily and become to be properly handle.

Table 2. Application of Information to City Planning and City Management

Application as a judgment material and objective evidence at the time of planning	By utilizing SNS accumulation type and automatic logging type, it is possible to grasp in a timely manner for a more extensive city. There is possibility that also lead to modification of planning technology and systems.
Application as an evaluation of the planning and practice	It is necessary to obtain an opportunity to evaluate. Not only evaluation by planning government, it is necessary also create a system for information disclosure and use that encourage aggressive evaluation in public and private.

3. The Flow of Information in the City

3.1 What is "Flow of Information"?

ICT should be commonly utilized as the infrastructure of the city. The society in which the unconscious and automatically feedback is occurred always will be arrived. However the impacts by the multimedia and the ubiquitous into the society have been mentioned, any concepts about the relationship between information and the city also have not been established.

Nowadays, many people can access to the information by ICT unconsciously using the personal devices such as PC and mobile phones and smartphones spreading information needs such as global and service information. However, it is not too much to say that there foundation for social leverage does not exist, while there is variety of information and people collect and use the data. Twitter that is used at the time of the Great East Japan Earthquake 2011 is something easy with respect to technical idea. But it was very characteristic that everyday "tweet" which is previous action before the intellects; -"feelings" and "awareness"- are seen as meaningful information. It is epochal mention that information was extended around the living city with connections between individuals. Information flow of Twitter was different from the assumed utilization of conventional governments information. It was a very interesting event, which is forced to think about the way of the future of information about the act such as "to support the city" and "make the city activities". The balance of infor-
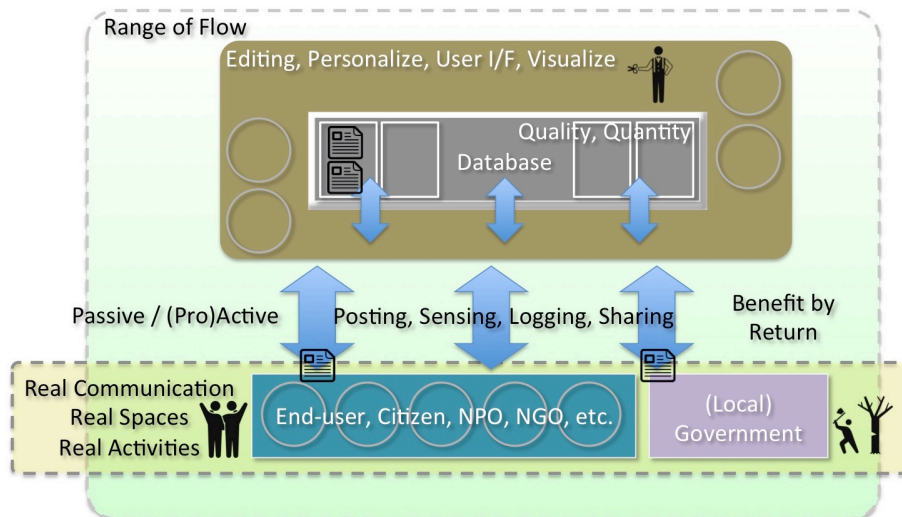
mation between society and individual is important for making the sense for creating future social.

As the essence of the near future of social activities, it has sought to migrate to the stage of transcendental intellectual creativity to resolve the mere single challenge. In this situation, it is the principal of the flow of information in the city how to control the flow of information as the social infrastructure. The urban society supported by the social infrastructure in this situation is also one that made by acquisition and accumulation and utilization of information about the city in which behaviors and feelings of people, social relationships and variety of urban spaces itself are constantly changing. In this section, it is tried to clarify what information is to use in any purpose and what features they have and what kind of efforts have been attempted focusing the "flow of information in the city".

3.2. The Model Outline and 12 Analysis Points of "Flow of Information in the City"

The model outline of the flow of information in the city is shown in figure 1. The 12 viewpoints at the time of analysis that describes this model are the followings in this section.

Fig. 1 The model of "Flow of Information in the City" concept

(1) The purpose of the information circulating

In the first, it is necessary to clarify what the purposes of the flow. In other words, it must be understood in relation to things like whether with what implications for the lives of urban society and people.

(2) Overview of real information flow

It is a need to roughly organize whether flowing from information is everywhere or everybody. It should be confirmed whether simple provided information or collection or the two-way, and even if the exchange of information makes sophisticated spiral.

(3) Operators and the methods of administration for a database to accumulate the information

In the model presented the figure, for convenience, it is centered on "database", although clear center may not exist when discussing the flow of information in the city. This database is not the specific electrical database system but the "database of the concept". Social platforms such as SNS, Facebook and Twitter would be one of the databases.

(4) The quality and quantity of the accumulated information

It is a necessary how and what information is stored in a database. It should be also mentioned to what is happening structure of accumulation of information.

(5) The characteristic and the location of the sender and receiver, an editor, a manager and so on

In this model, there are the incoming and outgoing of information, editing, visualization and personalization as the actions which involving in the flow. It is need to focus on whether principal related to these are, who, and their position. Furthermore, it should be mentioned also who runs a "system" of the flow intentionally or unintentionally.

(6) The range of information circulation

There is a need to organize what range information flow has. The range has two means, social scope and geographic range.

(7) Methods of collection and the return back of the information

It should be examined how to collect the information and return back. There are two ways to collect. One is the method of automatic collection due to sensors technology etc. and another is to post by users proactively. Some information is collected even unintentionally, that is side effects collection, when users do some action. And there are various media for collecting and returning of information. Some collection and reduction of information are performed in the internet. There is difference in the case using smartphone and using PC, using web site and a dedicated application. Furthermore, collection and return back of information in the real space also should be important.

(8) Methods of editing and the visualization of the information

It is an important performance to edit information as significant things. It should be considered how information is edited and how it is selected by what intent. Furthermore in parallel with the editing, it is also important that the process of visualizing edited result. It should be mentioned that visualization works considers who use the information after the editing in what kind of purpose.

(9) The benefit by returning of information to a sender and others

It should be considered what kinds of benefit are returned by information flowing back. It is necessary to pay the attention to both personal and social on the case.

(10) The sustainability and circulation of the flow of information

The system even has been completed of flow information, if that system is many are temporary, hard to say that useful. It is important how have the sustainability. Although there is a little ingenuity, game sense, getting point system, the introduction of such ranking system, the system is required to devise such conduct or of assessment has given the social and personally what effect. On the other hand, it is also important to check the motivation for the establishment requirements and management as a business model.

(11) (Re-) utilization of the information by the end users

It is considered how the end users use the provided, visualized and personalized information. There are surely many cases that end users interpret ed-

ited information for an individual and apply them and use them as suitable for themselves.

(12) The supplement and the reinforcement by the real users in the real world

Finally, it should be also checked that the state of completion and reinforcement by real users in the real world. The proneness to situation to neglect the existence of a real people and spaces when discussing about ICT, but should not be forgotten that ultimately requires a human hand.

4. The Fitting of "Flow of Information" to the Characteristic Cases

In this section, four cases are analyzed about the flow of information in consideration of the viewpoint in section 3.

(1) Amippy: The flow of information that is produced with commitment to real communication, http://amippy.jp/

Amippy is one of the local SNS that is a useful tool of regional activation. It is intended to promote of the communication for Nishi-Chiba area in Chiba Prefecture, Japan. Not only residents but also non-residents are also able to join to this system. The new registration is required invitation of existing users. Their registration in real name is principle. Amippy has particular about communication in the real spaces and activities. So, the real and virtual activities achieve synergy and lead to local activation.

(2) Toru-Shin: The flow of personal special information sends local charms, http://www.nhk.or.jp/shinshu-blog/

Toru-shin is a web site to introduce the natural resources of Nagano prefecture, Japan. Natural sceneries that Shin-shu (old name of Nagano) region is proud of are introduced by beautiful photography taken by the visitors. Photos to be stored in this site are very excellent. It is very interesting that creating the flow such as attract human continuously by conveying the charms of the region by information; beautiful photos that end-users have

created. This gives a suggestion how to create contents in the flow of information model.

(3) SeeClickFix: The flow of information to perform realistic measures, http://seeclickfix.com/
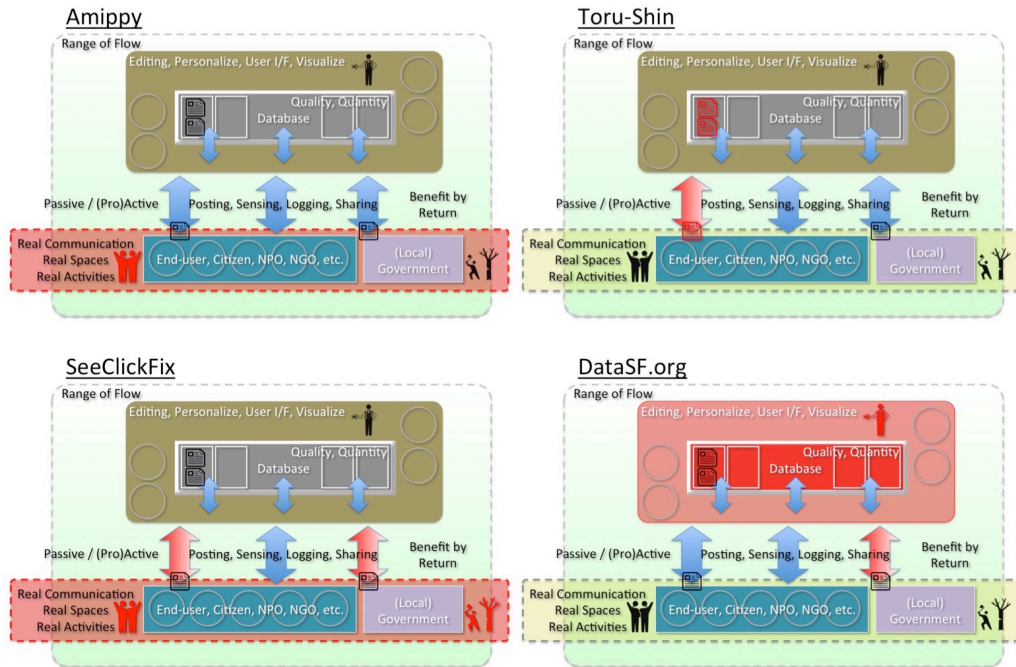
Seeclickfix is a community-based service that connects to the improvement of the district by posting small problems in the their own town. You can use this service in New York, San Francisco, even all over the world. It is possible to post from your own smartphone. This service is to form the flow of information to promote rapid response of administrative service by the system design such as "TOP PERFORMING CITIES", which is the ranking system, displayed on the top page.

(4) DataSF.org: The flow of information in Open Data, http://www.datasf.org/

DataSF.org is the pioneering efforts of open data. Each department of the San Francisco city is open of the electronic data set to be held. It is very interesting that attention to human assets of San Francisco unique that all world-seen full of ICT and innovation spirit of top level civil.

For example, on the basis of the data relating to recycling published by the environment department, the private company has created an iPhone application called "EcoFinder" to help the recycling activities in the residential areas of the citizen. Other, on the basis of the crime statistics data that has been opened to the public by the police force, a company made an application called "CrimeReports" by which citizens can receive alert e-mails about timely crimes and access to the database about crimes by entering the address on the GoogleMaps. This case is very suggestive about the requirements using and editing subject of isolated database on the flow of information model.

Fig. 2 Application to each case of the model

. The important matters are displayed in red color.

5. Conclusion

5.1. Changes in the City Life due to the Flow of Information in the City

The Local SNS with a realistic communication gives a synergistic effect on the activity of the local exchange. To provide many excellent photographs takes by individuals without editing tells an impression and pride to others. By gathering information in the spot from the citizen makes the local government respond quickly. Providing by the government a database to support the civic life has become richer in various fields life of citizens with being utilized the database by the private sector usefully.

Almost cases can conform to the "Flow of the information in the city" partly. Though all cases have given some changes into the city life, each the flow of the information faces a variety of problems at the present stage.

Therefore, it is important to consider the reaching points of this model today.

5.2. Reaching Points and Challenges of "Flow of Information in the City"

The Relationship between information and the Real Spaces and Activities

There are the case that realizes expression of the resident autonomy and tries to send to other areas with the improvement of homepage that is primitive internet information technology and the case to apply the information space as a tool helping the real communication in the real spaces and activities. These show the relationship with the "real" activities that is important for all ages and countries and the flow of information in the city to support them.

Connect to Things

The flow of information connects end-users and their activities. Tools for connecting everyone and everything are provided as the flow of information. It would be one of the goals as things that are connected by them. On the other hand, much valued information of end-users is a medium that connects the individuals who prefer it "the favorite" in an area. This is the generation of the flow of information that is what is propagated to other feelings (= impression) that admire the city (= place) and enrich the human mind.

Use of Mobile Device

There is a case that implement that users receive and transmit information in the spot. There are many mechanisms to receive information on the spot and to send to the server such as FourSquare. The first, the way of transferring information is converted to the method of post information to a PC at home from paper questionnaire, in the next, information infrastructure that it sends the information on the spot has been achieved by spread of the conventional mobile phones and new smartphones.

Therefore, as a goal of the flow of the information, it is not saying that incoming and outgoing efforts of information on the fly is not enough. Rather, transmission of information on the fly is an active action intended in the case of FourSquare and other services. This will be focused on a point.

Intentional Posting

It is also important to contemplate the concept of semi-automatic system by which end-users can post what they felt in the spot easily rather than automatically. The fully automatic might be possible to read the intentions and will from individual behavior, but it might not be true intension of them. On the other hand, semi automatic method has reflection of their intention or will. More extensive database should be built to add such semi automatic information accumulation to transmitting with conventional intention-will information and the fully automatic gathered information.

What and How the Database should be

It is no need that the owner and service provider of database are the same. For example, there is a case in which the local government has implemented measures by gathering information from citizens. That is, the database should be coexisting in which there are both the information owned by the local government and the information generated in the process of cooperating with the end-users.

Editing Functions

For editing, the important issues are "editing without the especial intention" and "individualization". Although it is important whether or not there is editing for the effective use of information, there is a need to understand the significance of editing in the collaborative society because it is different in for the commercial and for collaborative society.

There are cases in which the private companies and NPOs improve the database prepared by the government to the form that the end-users require for each service. It is a good reference considering the way of editing of the flow of information in the collaborative society.

No cases fit the presented model shown in this paper completely. Rather, there will be no cases that meet the model completely even in the future. This model is obtained by enumerating functions that can have the flow of information future urban society for planning and management. And hence, this is a help as reference points to examine whether the practice itself is working have what meaning and whether to consider what point on involving in each practice.

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