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Information and Communication Technologies (Icts) and Citizen Participation: a Case Study Involving the Brazilian National Health Council

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***Abstract*: The objective of this article is to present a case study on the process of constructing public health policies in Brazil aiming at the opening up of spaces for citizen participation supported by Information and Communication Technologies. As such, an analysis of Brazilian health councils was developed for the years between 2005 to 2008. These councils are deliberative bodies responsible for formulating and implementing public health policies in Brazil. Here, a methodology of social network analysis for identifying possible communication failures was utilized. Additionally, a conceptual model of citizen participation based on Information and Communication Technologies (ICTs) was developed which makes possible an increase in the participative spaces in the realm of Brazilian health councils. This study presents specific features such as, being a virtual participative space that understands the interactions among all of the actors, thus guaranteeing a greater opening for demands from the population.**

***Keywords*:** Information and Communication Technologies, Social Network Analysis, Citizen Participation, Brazilian National Health Council, Participation Spaces, Conceptual Model**.**

I. Introduction

Studies about Information and Communication Technologies (ICTs) in Brazil are still incipient and there is not a strong propagation of initiatives and practices that confirm ICTs' potential use in expanding the space for democratic debate. In regards to this subject, the general aim of this paper is to introduce an analysis of the Brazilian experience in citizen participation for constructing public policies starting with a case study involving the Sistema Único de Saúde (SUS) or the Brazilian National Public Health System. This paper presents, through social media analysis, the interaction between government and society in order to expand citizen participation spaces based on ICTs. [1]

For there to be significant change in organization structures, new paths for the better use and contribution of electronic means may be presented with the goal of increasing democratic participation in the country. One of these mechanisms is the organization of political networks, supported by technology. In order to reach this level, it is necessary to take into consideration the expansion of participative space and the improvement in conditions where information transactions are already efficient. The main focus of this research is undertaken from the perspective of expanding citizen participation in the debate about constructing public policies in the National Health Council and the National Public Health System in Brazil between the years 2005 to 2008. [2]

Today, Brazilian Health Councils are bodies where there is an institutionalized space which foresees citizen direct participation in public policy construction. They act in formulating strategies and in controlling the execution of health policy in corresponding bodies. This is inclusive of the financial and economic aspects and also whose decisions will be ratified by the head of the legally constituted power in each sphere of government, meaning within each of the government's spheres – municipal, state and federal government.[3]

The health councils were created to assure the necessary support for the National Public Health System's actions. This system aims to promote the health of Brazil's population. It also gathers all social and political decisions taken regarding this subject in Brazil.

With the aim of improving the existing communicative flux and the opening up of citizen participation space, a study on citizen participation based on ICTs which enabled the expansion of participatory spaces within the Brazilian health councils was developed in this paper. The study introduces

network analysis and takes into consideration the relationships among actors who participate in the process that seeks an analytical model that aggregates some features such as: being a space with virtual participation that understands the interaction among all actors, assuring a greater opening for the demands of the population.

II. Participative spaces in the realm of Brazilian Health Councils: a methodology of Social Network Analysis

Information and Communication Technologies (ICTs) are catalytic vectors for expanding participative spaces and in the context of representative democracy; they make the insertion of citizens in public policy construction easier. This research analysis comes from the observation that an understanding of the environment involving the National Health Council and state and municipal councils cannot take place without the task of constructing and critically examining those participation spaces. These spaces are institutionalized and defined by law as key spots for citizen participation in constructing public policies and in exercising social control in Brazil [4].

There are some factors necessary for having conditions for participation, such as: the opening of possible communicative channels; information access and transparency; continuing education development; and the insertion of information and communication technologies. In the case of Brazilian health councils, there are huge barriers related to the lack of a balance of powers among the participating actors in this process, in relation to information access and the attributions defined for each actor involved. The actors referred to in this study are citizens belonging to nongovernmental organizations who directly participate in constructing public policies, government leaders and healthcare professionals [5] [6].

From this identified situation, a methodology was applied where there was an understanding of the reality presented as a way of finding possible solutions for opening up participative spaces. Two methods were used based on the critical systemic methodology, constructing a relationship map, in order to identify the complex structure introduced by the Brazilian government, and a Social Network Analysis, as a way of pursuing an understanding of the relationship between the two sides. The methodological analysis is divided into three parts described below.

The first step addressed the system's limits under which the analysis was made. References proposed by Ulrich (2002) served to define the system [7]. The Critical Systemic Theory prioritizes the task of identifying the actors who participate in this process. After the system, which involves flows of communication between health councils and related government bodies, has been defined, we go on to stage two where a description of relationships among the actors was made so as to verify their bonds and to understand the Brazilian health councils' situation. Identifying in this way, features of the networked formed and mainly of the citizen inserted into this network while being participants in a political network. In addition to this, identifying the channels that exist between government and citizen was also sought. In the third step, analyzing the balance of power among the actors with the aim of expanding participative spaces through ICTs was undertaken.

A. System identification

The first step of the analysis is divided into two complementary phases. The first one is related to defining the actors who make up the system in order to delineate the political network. Essentially it delimitated the boundaries of the analysis system which includes the Brazilian healthcare system and its decision-making bodies. The second one is about comprehending relationships among the actors involved. It explains how citizen participation happens in this context.

According to Ulrich (2002), there are three classification types concerning the actors involved in the policy formation process: the clients; the decision makers; and the experts. The *clients* demand the necessities and in this case study they are citizens; the decision makers have the power to make the decisions and are identified here as politicians; and the experts know the processes technically so that the process exists, and in the situation of Brazil, they are the bureaucrats. All of these actors have participatory power [8].

Managers represent the decision makers in the system. But there is the assurance that citizens who participate in Brazilian Health Councils will also take part in this process, thus legitimizing the actions taken. To guarantee success so that the system is balanced and meets the demand is that there is a greater insertion of citizens in policy construction to assure that those demands are met, since they are the ones most affected by that very system. From assessing documents that institutionalized SUS and from the history of its formation, the chosen system should serve the purpose of defining policies closest to citizen's daily life, considering features such as more humane assistance, minority health, equality, in addition to providing health services for all citizens.

From this point of view, the measure for success in this system is the guarantee that citizens participate in defining and planning health policies, first, locally (in their own municipalities). Moreover, those policies must be aligned with their reality. Besides, they must have conditions to exercise social control to verify compliance with the actions developed by managers and bureaucrats.

Politicians and bureaucrats control a greater part of the system. . In general, these are the actors that determine which policies will be established in all cities and who control Brazilian city and state health planning. This shows that the Ministry of Health, a federal government executive body, is the major decision making center despite the fact that the country has characteristics of a decentralized State where any federal, municipal or state body has decision-making power concerning its own reality .

In the case of public health policies, the local councils are tools which listen to the citizen and assure that he will take part in defining policies and in accompanying the actions taken. But according to the current view, participation is weak and there are few resources for the citizen to effectively enter into this process. There is no communication fluxes established that lead to citizen participation.

To analyze the Brazilian council situation, 11 actors were identified who participate in the construction process of Brazilian health policies: the Ministry of Health, the State Departments of Health, the City Departments of Health, the National Council of Health Secretaries (Conass), the National Council of City Departments of Health (Conasems), the Tripartite Inter-management Commission (CIT), the Bipartite Inter-management Commission (CIB), the National Health

Council (CNS), the State Health Councils, the City Health Councils and the Regional Management Collegiate (CGR). Identifying the actors made it possible to formulate explanatory charts regarding the composition and tasks of each part of the Brazilian public health system. Table 1 presents the classification of actors that take part in making public health policy in Brazil.

Table 1. Actor classification in public policy formulation.

Actors	**Motivation**
Ministry of Health	Decision maker
State Departments of Health	Experts
City Departments of Health	Experts
Tripartite Inter-management Commission	Experts
Bipartite Inter-management Commission	Experts
National Council of Health Secretaries	Decision Maker
National Council of City Departments of Health	Experts
Regional Management Collegiate	Experts
National Health Councils	Decision Maker
State Health Councils	Decision Maker
City Health Councils	Decision Maker

Having set up this information in the proposed system, there is still a crucial point for analysis: inserting citizens into the policy formulation process. This means analyzing the real conditions for citizen participation.

The citizen has his place assured by federal law within the National Health Council. His participation must respect an equality established by the national health council's statute which foresees 50% of places for citizen entities, 25% for health worker entities and 25% for government representatives and service providers.

An analysis of the number of citizens that take part as health counselors shows that in many Brazilian cities equality (types of participants per percentage) is not respected. In the state of Amazonas, for instance, only 49% of city councils fulfill this equality in relation to the number of citizens. In Roraima, another Brazilian state in the north of the country, it is only 40%. States like Rio Grande do Sul (10% of councils do not respect the number established by law for citizen occupation), São Paulo (15,5%) and Rio de Janeiro (6%) are the states with the lowest rates of such occurrences, and therefore they are the ones that keep citizen participation more active. This data is not final, but it is very symbolic of citizen participation in health councils [9].

B. Relationships among actors

From identifying actors and their relationships, a map of relationships was drawn which enabled the flux of activities to be seen. This allowed for the blank spaces and flaws in the flux of communication among actors to be found, and above all verifying citizen participation in council spheres.

The relationship map was made based on health planning in Brazil using the year 2009 as a base. Due to the complexity of setting up a structure that incorporates so many instances and actors at such varying moments of action, the set up was divided into three parts. The first part took into account formulating the guidelines for health policies until the moment this information gets to the Ministry of Health. The second shows how strategic planning happens in relation to the health policies. The third demonstrates the tactical-operational planning executed from the national health plans and represents the practice part of health actions. [10]

The two managing bodies, the Tripartite Inter-management Commission (CIT) and the Bipartite Inter-management Commission (CIB), end up breaking or disrupting the communicative fluxes where there is citizen participation. Such a factor leads us to visualize a network formed by actors acting in a highly hierarchical way and centralized with bureaucrats and politicians as the main actors with roles that command the decision making processes in public health policy construction and formulation in Brazil.

The communicative flux (see item 3) among actors shows that at both strategic and tactical levels decision making control is concentrated in the Tripartite Inter-management Commission, formed entirely by managers (politicians and bureaucrats). This commission is responsible for concentrating the greatest quantity of information related to the decision making process.

C. Network indicators

The collected data aims to evaluate the size of the network, in terms of participations realized by its integrants. This data was the starting point to figure out various network measures: network centrality, betweenness centrality. Each actor's centrality measure, in addition to measuring one person's accessibility also measures the quantity of communicative paths that pass through it. Based on those measures, it was possible to make inferences regarding actors that had been performing critical roles, in other words, important roles in the network. Signifying: central connector, transactional content corrector and boundaries extender. After collection, the group relationship and each individual's role in the

mapped network were analyzed. Table 2 was prepared to begin the analysis, which illustrates, in a simple way, all interactions performed from communicative fluxes and links in the system delineated by the relationship map.

Table 2. Interactions among network actors.

Actor	Acronym	Interactions
1- Ministry of Health	MS	COSS, CIT, CNS, COMS, CIB, SES
2- State Department of Health	SES	MS, COSS, CES, CIB, CGR, CIT
3- City Department of Health	SMS	CGR, CIB, CMS, CIT, COMS,
4- National Health	CNS	MS, COSS, COMS, CES, CMS, CIT,
5- State Health Council	CES	CNS, CMS, CIB, CIT, SES, COSS
6- City Health Council	CMS	CNS, CES, SMS, COMS,
7- Tripartite Inter-management Commission	CIT	MS, SES, SMS, CNS, CIB, CGR, COSS, COMS, CES
8- Bipartite Inter-management Commission	CIB	CES, SES, MS, CIT, SMS
9- Regionalization Management Committee	CGR	SES, SMS, CIT, CIB
10- National Council of Health Secretaries	COSS	CNS, MS, SES, CIT, COMS, CES
11- National Council of Municipal Health Secretaries	COMS	COSS, CNS, CMS, MS, CIT, CIB, SMS

Accordingly, the first drawing formed by all actors and their complete relationships can be verified. The blue squares indicate the ties/nodes (or actors), the arrows show the flux (bi or uni-directional) and the lines between the arrows represent the links. [11]

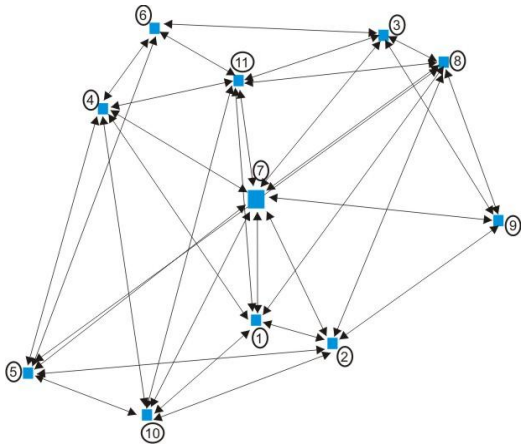

Figure 1. Networks formed by all actors and their relationships

An inherent relationship among the parts is clear. To facilitate this view and to understand each actor's participation, it is necessary to analyze some specific questions, like the network's density. The density degree is calculated by dividing the existing number of relationships by the number of possible relationships and multiplying by 100 [D= ER/PR x 100]. The total of possible relationships is calculated by the number of ties minus 1, so for this network the possible relationship number is [PR= NTN x (NTN-1)]. We have, then, a total of 11 ties and 64 relationships.

Possible relationships (PR) = 11 x (11 -1) = 110

Density calculation (D) = (64/110) x 100 = 58, 2%

This network's connectivity is a 58,2%. It is not wrong to say that it has an average tendency and it can have greater connectivity, depending on how the relationships are drawn. Actors' connectivity is measured by the degree that they relate to each other in this network. From the simple matrix, it can be verified that the City Health Councils maintain a weak relationship with other actors. [12]

D. Betweenness degree

This measure shows communication control inside the network. It shows the intermediacy/betweenness among parts, or a tie's capability of intermediating communications among its peers. For the network, this measure was set up and it turned out that the highest intermediacy/betweenness degree is 14,4%, in a normal result, for the Bipartite Inter-management Commission. One of the lowest betweenness degrees is that of the City Health Council with 2%, reflecting once more its low or almost zero capability of communication inside the network. Due to this huge difference, the average betweenness degree is very low in relation to the main actor. This relationship shows who is responsible for many communicative processes.

Some problems related to the lack of participation are: lack of basic conditions for taking action, lack of information, lack of a necessary infrastructure (in communication, in the workplace, among other resources) for actual participation. The Brazilian government underestimates these actors, and attributes the lack of participation to being a cultural matter in relation to management or ignorance about technical or specific legal subjects. In addition to that, there are many

councils in Brazil, made illegally, that do not obey the segment equality proportionality. [13] [14]

In order to have a clear and objective view of citizen participation in the councils, a compound network was drawn from those that belong to health plan formulation at the local government level. It is represented by Brazilian cities so that this process is shown, focusing on citizen participation.

III. Communicative fluxes and citizen participation

To show citizen participation in the City Health Councils, it was necessary to choose one moment in the system delineated so as to make visible its participation. The moment of the local health plan's formulation was chosen as a way to demonstrate where this actor takes part (or should) in the decision making steps in relation to local policies.

Two charts concerning possible relationships based on legislation were created for developing the graphs in relation to this network. The first situation represents decision making according to the actors. Such situations are found in most Brazilian cities and the second situation represents relations with a new actor: the citizen who symbolizes dialogue with society.

A. Situation 1

Table 3: Actors who took part in situation 1.

Actors	Acronym	Relationship
Manager (politicians)	GE	EP, CS
Planning team (bureaucrats)	EP	GE, AT
Technical areas	AT	EP
Health council	CS	GE
Citizen		

The chart above presents all actors that could possibly take part in planning the health plans in the city. The first situation positions the citizen as a non-acting actor in the process. The network created presents a density degree of 30%.

There is a very low degree of interaction that represents a small communicational flux, practically centered on a few actors. Notice how the structure is almost linear for decision-making.

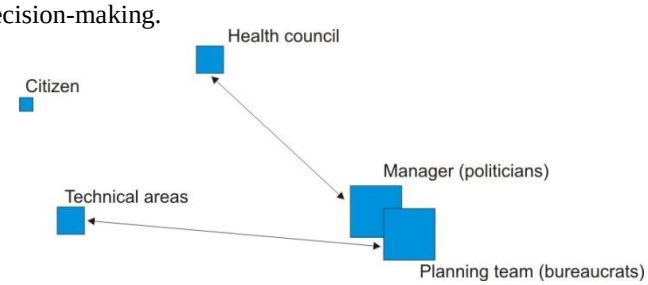

Figure 2. Network formed by actors that participate in situation 1

B. Situation 2

Table 4. Actors participating in the situation 2 network.

Actors	Acronym	Relationship
Managers (politicians)	GE	EP, CS
Planning team (bureaucrats)	EP	GE, AT, CD, CS
Technical areas	AT	EP
Health council	CS	GE, EP
Citizens	CD	EP

Situation 2 is a little different from the former one. It presents some differences in terms of participative conditions; there is greater interaction among the decision-making parts. This network's connectivity is 50%, a better result than before although less satisfactory in relation to the attainable degree. There is a difference not only in the structure, but also in an actor: the planning team. This actor determines the relationships of all parts of the network, among the council, citizens and technical areas. So it is the manager, as practically the only actor, who commands the formulation of strategies for the city's health.

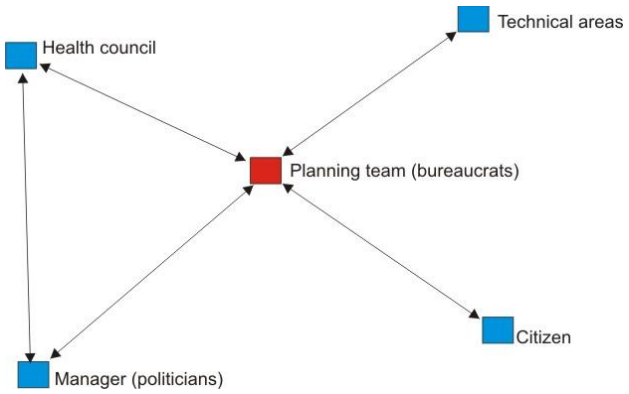

Figure 3. Network formed by actors in situation 2

After having the tables in place, it is impossible to resist thinking about solutions aimed at getting the citizen closer to decision-making. The main goal of this paper is to verify if technologies can catalyze participation, but before giving any answer, it is necessary to reflect under which conditions this could become a fact. So, the last part of the analysis opens with the pursuit of structural solutions that may provide conditions for expanding communication through ICTs in the expansion of participative spaces that involve public health policy formulation in Brazil.

IV. Contributes to opening up participation spaces

Through the above analysis, it was confirmed that the network, made up of all the system's actors, presents an average density and the connections are concentrated especially in a specific actors' group, that of the managers. The interaction is low and rare, mainly in the case of City

Health Councils. That situation describes how the established relationships are organized around a central actor who commands a greater part of the interaction flux among actors. The illustrated networks suggest the system's environment is marked by elements of power and by patterns that obviously split what the center is and what is at the system's boundary. It may be stated that this is not a cohesive network, for it almost totally excludes its clients from the participative process. On the contrary, it is established especially as a way of fulfilling the manager's will. So, the deliberation and control instances are totally commanded by restricted groups, where the citizen does not have space to demand his needs. It is understood that in the City Health Council context, there is the biggest gap but also a greater opportunity to change this reality.

A greater degree of electronic democracy (and the most idealistic) is in promoting direct participation, using ICT resources. The ICTs would have the role of opening up possibilities for interactive communication, where there is a movement on the rise responsible for promoting such a situation. But, for there to be this movement, the structures cannot be rigid, they must be flexible in a way that embodies such communicative aspects. This optimistic approach insists on the fact that there cannot be a single sovereign entity, but a variety of actors whose network interactions may result in new forms of participative management.

There are many types of problems to be overcome in order to arrive at that reality, starting with the operational structure that should be changed. Primarily, in order to have greater density, it is necessary to interconnect the actors in a more balanced way. The proposal is to hypothetically re-draw part of the system, in an effort to reformulate some of the network's positions, so as to expand citizen action in decision-making.

The structural change must be done with the aim of flattening relationships and expanding participation spaces. As a way of allying with citizen interests, we thought about another way of coordinating the parts that would make up a deliberative body, which would keep the existing equality. When there is a hierarchical chain, the information rarely flows quickly. Usually the channels are sluggish and the communication very slow. Or also the information is not passed on. A model where one main actor centralizing information does not have command, leaves the network more open and ready to receive and to transfer information to all participating actors. Theoretically this would exclude questionable interactions and would open up space to expand social control.

In addition to giving new shape to actor relationships, the citizen would be included, whether he be a health worker or a SUS user, as a fundamental piece in the participation of the planning team which makes health plans. In this way, they follow the process of local policy formulation and still have sufficient knowledge regarding the annual plans, in a way that they may be closer tothe assessments and results from implementing health actions for the city. Finally, citizen insertion that does not belong to the deliberative body could be guaranteed directly with their representatives if there were channels open, considering that is through councils that the citizen has a voice.

Information and communication technological resources, especially the internet, enable the distance between citizen and government communication to be reduced. Besides this, these resources solve a big representative democracy problem related to the impossibility of direct consultation for citizens, which is due to the immensity of Brazilian territories and the population increase. In this proposed model ICT use is essential, be it through more common channels like telephone or e-mail as well as taking into account the opening of new channels through internet, where information can be exchanged with all actors participating. Those channels could give communicative support to the structure.

For instance, a chart was made showing actors and their relationships. It works in the following manner: the deliberative body is an instance that is open for debate among parts. It is in this space, with many representatives, that citizens (non-representatives) and health workers could make demands, give opinions and follow the formulation of the health plan as well as see them carried out. For this to happen, there must be communication channels, like telephones, e-mails and other available tools that make it easier for the population to gain access through an internet space, where the deliberative body can achieve a material strength.

So it is necessary to verify if this hypothetical organization model based on ICTs contributes to opening up participation spaces.

Table 5. New model's participant actors.

Actors	**Acronym**	**Interactions**
Manager	GE	EP, RG
Planning team	EP	GE, RG, RU, RT
Management representatives	RG	GE, EP, RU, RT, CD, TS
User representatives	RU	EP, RT, RG, CD, TS
Worker representatives	RT	EP, RU, RG, CD, TS
Citizens	CD	RG, RU, RT, CD
Health workers	TS	RG, RU, RT, CD

The density was measured to confirm if there is or is not any expansion in actor relationships. For this network, there are 42 possible relationships for 30 existing relationships. The result according to the density revealed a considerable increase in all interactions among actors, reaching a value of 71,42%. This is a positive result, if we acknowledge that the maximum of possible relationships for a network is100%. But it is also necessary to validate the degree of centrality in this network as a way to see if there was a change in behavior. The centrality degree was calculated to substantiate if the relationships among actors was balanced. From the chart above, it may be verified that the centrality in this network is balanced since all actors have a centrality degree higher than the average, of "4,266". The only actor with a lower centrality degree is the manager, but in this case his balance is maintained by the two instances commanded by him, which have higher degrees: the planning team and the manager's representatives.

We became concerned about presenting a view from which the citizen did not lose the rights he acquired in Brazil's 1988 Constitution. Even so, it is believed that the study may show that there are ways of expanding participation and furthermore we should think about how to embody such

changes. This is due to the fact that the intensive incorporation of ICTs, responsible for maintaining a network's working conditions, is able to promote access to a greater number of participants.

V. Conclusion

In this research, we understand participation to be an indispensible component to constructing citizenship. For this, we cast an eye at the citizen as one of the agents that acts in the decision making process, responsible for constructing and controlling decisions. It is an action in favor of the collective interest or even of national social groups which is the very legitimacy of acting on behalf of the collective.

In respect to citizen participation within the network formed in municipalities among councils, managers, technical planning teams it was verified one more time that the citizen has almost no power in the process of formulating policies. We verified here that the structure presented in the complete network is repeated and that it is the managers who dominate local relationships.

Despite the fact that there are councils, we saw that they are extremely bureaucratic furthermore what is seen is that the council is really just a tool for managers to act according to their own will. In the end, it is the government's agenda that dictates the rules in any given situation, disrupting society in relation to social control.

With the aim of improving existing communication flows and the opening up of citizen participation spaces a conceptual model was developed based on ICTs that enables the broadening of participatory spaces in the context of councils. The model has the following characteristics: to be a virtual participatory space, that includes interaction among all actors, guaranteeing a larger opening for the demands of the population. Despite being set up as a hypothetical model, we are able to verify through social network analysis that the model displayed a considerable increase in the interaction among actors in the process, reaching a value of 71,42% out of a maximum of 100% of possible interactions.

Information and Communication Technologies occupy a central spot when the subject is citizen participation in decision-making processes, within health councils. The opening up of channels' for communication, access and information transparency in addition to developing and continuing education are determining factors so that there are conditions for participation in those places. These factors influence not only decision-making, but all democratic and participative construction processes in society. The use of ICTs refers to the way through which a technological device may be used to support the development of goals, particularly those related to social, political and economic development.

It is considered that policies by the Brazilian Ministry of Communication are necessary as a way of providing all Brazilian cities with infrastructure and broadband access. This is fundamental in order for citizen participation spaces to evolve. It is still necessary to implement actions as a way to build integrated information systems which facilitate the complete pursuit of information which make the information public; it is necessary that it be accessible, so as to promote the comprehension of information by any actor that takes part in this process, regardless of having technical knowledge or not.

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