

# **Innovation for the ongoing National Care System: contributions to the promotion of social inclusion**

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## **Abstract**

In recent years, Uruguay has experienced several changes in the orientation of public policies, such as the diversification of social policies and the new STI policy. Although they have the same objective which is to contribute to social inclusion, in general, these policies are not related. Due to this mismatch, it is quite unlikely that social needs can be satisfied through their convergence with STI capabilities. This project focuses on the development of the National Care System in order to formulate questions and provide preliminary reflections about the implications of directing STI production towards social inclusion. These questions approach the interaction between the social problems associated with health care and STI production, the determination of what a social problem is and the role the STI can play to solve it as well as the possibilities of building a health care innovation system at national level.

## **Introduction**

The building of a National Care System (NCS) has been installed in recent years as a social policy priority in Uruguay. Starting from the conjecture that the integration of Science, Technology and Innovation (STI) as a component in the design of social policies can be an important factor for their success, my research proposal aims at exploring this conjecture by analyzing a social policy in the making, the NCS, with far reaching social impacts.

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In our society a great extent of the welfare is provided by households, where the care of the dependents is a key factor to ensure the quality of life and to support the social fabric. In this sense, care is a matter of social inclusion because, on the one hand, meeting care needs is crucial to the development of individual autonomy and capabilities and, on the other hand, the provision of care is based primarily on the time and effort devoted by women, which restricts the possibilities and the quality of their integration into other social and productive spheres. (Nussbaum; 2003)

In Uruguay, the NCS was initially demanded by women's movements. In 2008 it reached the level of social policies promoted by the Ministry of Social Development. In 2011, the NCS was in a primary stage of debate and discussion with the actors involved. Politicians, technicians of the government and social organizations on behalf of the users participated in this debate. Researchers from the social sciences participated as well, for example from economics, sociology, social work and psychology. Many of these disciplines have made substantial contributions to visualize the care problem and its consequences. But, how can the other disciplines contribute? What can engineering say about this issue from their expertise? What can medical technology or health sciences contribute to the solution of the care problem? The error could be in the conception of what a social problem is and who can help fight it. If we face a complex problem and this is not approached from cognitive diversity, the solutions to it will probably fail to take an innovative step further.

There is a mismatch between the design of STI and social policies in developing countries. On the one hand, the design of social policies fails at wholly capitalizing the capabilities of the STI policies to deliver possible solutions to tackle the social problems involved. On the other hand, STI policies do not take into consideration many social policies demands of great importance. Perceiving this mismatch as negative for social welfare is based on the assertion that STI is a key element -combined with others- for reversing social exclusion problems. However, to better understand why the mismatch occurs and how it could be redressed, further refinement of the concepts used is required. At least three issues shall be discussed: i. What is meant by social exclusion and by its opposite, social inclusion? ii. How can STI contribute to social inclusion? iii. Which are the other factors that should be present to accomplish this goal? Likewise, how these questions can be used to throw light into a social policy like the NCS shall be discussed.

The social demands the STI production could contribute to are expressed in multiple fronts. Bearing in mind the demands of the NCS on STI enables a multifaceted approach; such demands provide a broad framework for contributions from a wide variety of disciplines and fields. Furthermore, as a policy whose design is still in progress, the NCS provides an ideal scenario to assess the actual meaning of a “STI policy oriented towards social inclusion”.

In light of the above, some questions raised are: How do policies - in this case the NCS - define the social problem they address? Within this definition, how does the creation of STI contribute to the solution of the social problem involved? How is social inclusion conceptualized and what is the role of social policies in relation to the development of STI policies? The previous questions are embedded in a complex map of relationships among actors and institutions. Who are the relevant actors and institutions that may configure a system of innovation in health care? What are their relationships? Are there any channels of communication between them? How do the definition of a social problem and the role of STI model the policies’ convergence and divergence? For this analysis the National Innovation System (NIS) approaches are used as references bearing in mind their specific implementation in Uruguay, a “Southern” country.

The preliminary design of the methodology is based on a sequential study in two levels. Firstly, at the macro level, we focus on the construction of meaning from social and STI policies. Secondly, a descriptive approach is used to reconstruct the map of relations among actors and institutions in three dimensions: social and STI policies (State), knowledge supply (Academy) and service supply (Market and State). Thirdly, at the micro level, examples of innovations aimed at solving health care problems are identified and the journey through the map constructed earlier is discussed.

This paper presents preliminary reflections around this complex topic to be deepened in the course of Globelics Academy and especially when working on the PhD Program.

## Framework

### 1. General issues on social exclusion

*And yet we also live in a world with remarkable deprivation, destitution and oppression. There are many new problems as well as old ones, including persistent poverty and unfulfilled elementary political freedoms as well as basic liberties, extensive neglect of the interests and agency of women...* (Amartya Sen; 1999: p. xi)

Amartya Sen's quotation serves to introduce the general problem analyzed in this paper: the relationship between social inclusion of vulnerable groups and the creation of STI in developing contexts. The causes of social exclusion, following the capability approach of Amartya Sen (1987), cannot be limited to income poverty as they actually derive from a multidimensional phenomenon. This is so because not all individuals have the same ability to transform resources, such as income, into achievements. The capabilities represent the potential that an individual has to take advantage of opportunities in different areas (i.e. nutrition, health, housing, participation in social life, etc.) and transform them into improvements of their quality of life, which are expressed as individual freedoms (Arim and Vigorito, 2007). Sen (2000) distinguishes two ways in which social exclusion can contribute to capability deprivation: one that implies constitutive exclusions and the other that implies instrumental exclusions. For the purposes of the present work, both types of exclusion, constitutive and instrumental, will be further analyzed in relation to STI possibilities to redress them.

Sen's approach is especially useful in order to understand the multiple situations of exclusion experienced by women. According to Nussbaum, in our society, one central issue for welfare provision is the attention to people who are physically and/or mentally dependent on others, like: children, the disabled and the elderly. For gender justice this is an essential topic because most care is provided by women, often without any public recognition that it is a job. The time and the effort women devote to care activities make the chances to develop their skills in other areas difficult, especially the skills needed in the public sphere. (Nussbaum;2003)

In most Latin American countries, women who are heads of households in poverty remain one of the so-called "hard core of inequality". The incorporation of women into the

workforce is affected by the burdens of household and care work. This is particularly important for women in the lowest quintile of income. The fertility rate is significantly higher among women who have not completed primary education, thus increasing care needs and reducing the per capita income, as they live in larger households. The situation becomes more complex in the case of heads of single-parent households, where tensions between reproductive and productive work are determining factors in shaping social exclusion. (ECLAC, 2011)

For the Uruguayan case, two embedded issues need to be emphasized. On the one hand, in the first percentile of income, the female participation rate is much lower than that of men. This suggests the need to move forward in the construction of a social protection system that enables, institutionalizes and provides elements so that all active household members develop and can freely choose a career path and a family. At present, public policies and institutional frameworks do not allow this development. (Arim, 2009). On the other hand, Uruguay still faces a problem regarding poverty in childhood; half of the children are born in households below the poverty line.

At this point we can ask ourselves: After all, why could care be an important issue for the development of STI? Similar questions made by Nelson (2011) about the development of educational practices could be applied to the care practices: if it is a fundamental human condition, why do we make so little progress in finding solutions that reach the entire population? What kind of knowledge is necessary to sustain and improve practice? We must recognize that exploring the relationship between the NCS and STI implies entering a dark spot, where the accumulation of knowledge and expertise is very uneven and where success is not quite obvious. However, in Nelson's words, "This is not to argue that research in the field should be abandoned. Important finding and inventions can occur unexpectedly". (2011: 687)

## **2. How can STI contribute to social inclusion?**

Concern about the link between Science and Technology and social problems is not a new issue in the Latin American context. Between the 60s and the 70s a number of intellectuals, such as Sabato and Botana (1968), Amílcar Herrera (1973), Oscar Varsavsky

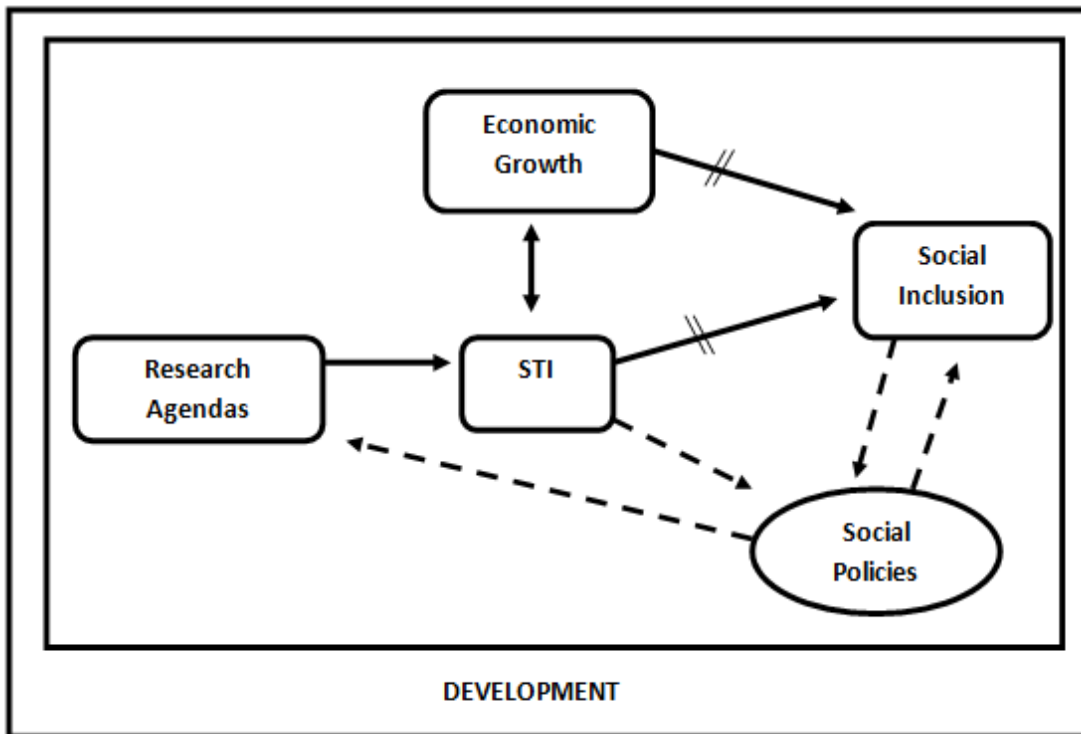
(1969) questioned the poor relationship between the production of Science and Technology and the social needs of their contexts. These perspectives are then poorly retaken between the 80s and the 90s within the framework of new paradigms for the development of Science and Technology driven by neo-liberal policies.

In recent years, several studies both from academia (Arocena and Sutz, 2010; Cozzen; 2009) and from international organizations (UNDP, 2001; ECLAC, 2010; WB, 2010; IIDRC, 2012) have come to recognize the important role that the creation of STI has in directly improving the living conditions of marginalized populations, that is, the potential role of STI in reversing processes of social exclusion.

However, much work remains to clarify theoretically and empirically what driving the creation of STI to social inclusion problems actually means. For example, according to Gras (2012), the notion of inclusive innovation is a conceptualization that is increasingly attracting interest in the field of research and policy. Nevertheless, this term is rarely specified and it is used interchangeably throughout a number of different topics.

The production of STI for social inclusion is preliminarily defined in this work as one that is directed explicitly to the resolution of problems affecting the most vulnerable sectors of society (Bianco et al, 2010). This is an interactive process involving several agents, whose efforts must be coordinated and oriented systemically to resolve some of the most urgent social problems. (Gras, 2012) Based on Sen's approach, social inclusion issues, retaken from this definition, are conceptualized as those that severely affect quality of life of part of the population, at the material and symbolic level. These issues refer to the disadvantages of individuals or social groups that arise from being excluded from opportunities shared by others (Alzugaray et al., 2011). However, as the authors of reference comment, guiding the creation of STI to social inclusion problems is an extremely complex process and further studies need to be conducted to fully understand STI's impact on social inclusion.

Figure 1: STI directed to social inclusion



The concept of inclusive development is the general framework to begin to review the complexity of the relationship between STI and social inclusion. It is understood that development can only be inclusive when creating opportunities and liberties for all groups of people so that they can share the benefits of development and participate in decision-making processes involving their lives and their environment (UNDP)<sup>2</sup>. These ideas include in the development definition, on the one hand, notions of human development, understood as the expansion of capacities and potentialities of human beings and their freedom to make decisions and live dignified lives and, on the other hand, the idea of sustainability, according to which development should meet the needs of present and future generations. According to Sunkel and Infante (2009), an inclusive development strategy requires a leading role of the State in the transformation process and openness to social and political participation of excluded groups. A key factor in inclusive development, highlighted by the authors, is a better primary distribution of income while abandoning the idea of a posteriori redistribution of a small fraction of the income generated by growth.

<sup>2</sup>See:[http://www.undp.org/content/undp/en/home/ourwork/povertyreduction/focus\\_areas/focus\\_inclusive\\_development.html](http://www.undp.org/content/undp/en/home/ourwork/povertyreduction/focus_areas/focus_inclusive_development.html)

This is where the first source of complexity to link the creation of STI with social inclusion resides. As shown in the figure, this complexity is due to the fact that it is not through linear processes that success is to be achieved. The illusion of a linear relationship between STI creation, economic growth and improved quality of life is refuted in the light of the prevalence of broad social sectors unable to access the benefits of economic growth. The so-called gap 90/10, coined in the realm of health policy, is a good example of the latter. Such gap arises because less than 10% of world research expenditure on health is devoted to investigating diseases that account for 90% of the global disease burden, particularly affecting the populations of developing countries.

A second source of complexity derives from the fact that the positive results of the STI production do not guarantee by themselves the achievement of social inclusion. Although this is a central factor, it is only one of the many steps involved in a complex network of interaction between different actors and interests. Nurturing research agendas with social demands is a fundamental first stage in this process. As a result, it is necessary to consider the functions, roles and coordination capabilities of all the actors in the system.

The National Innovation System's approach is taken here as a reference that serves to unravel the role of different types of actors, their division of labor and the investment and activities within a field as well as their interaction patterns. (Lundvall, 1992) The NIS concept enables the analysis of resources allocated to the advancement of knowledge and the way these are organized and managed. (Nelson, 2011) This approach is useful also, following Cassiolato and Lastres (2008), in order to emphasize the role of the State, the importance of context, the localized character of innovation and the power relations within the system. These factors will shape the research problem being addressed.

The user- producer interaction approach developed by Lundvall (1985) is used here to highlight the relationship among the actors involved in innovation processes. Firstly, in order to lead the innovation process, having information on the technical opportunities is not enough. It is also essential to have information on the user needs. These needs are generally diffuse and depend on the features and capabilities of users -for example if they are professionals or final users. The interaction between the user and the producer, which implies links and information channels, can take three forms: product exchange,



information exchange and cooperation. To analyze these information exchanges and all forms of cooperation it is necessary to take into account the distribution of powers between users and producers. The interactions generally occur within hierarchical relationships, where the distribution of competences to conduct the innovation process is unequal between users and producers. This approach alerts on the necessity to examine the particular power relations between users and producers, especially those which are related to access and ownership of knowledge.

Arocena (2010) discusses the concept of power in Michael Mann's work (1986, 1993) and suggests that within the four sources of social power (ideological, economic, military and political) that determine the structure of society we add the role of knowledge. All this represents the infrastructure of a new network of the dominant power in our times, which has been forged by the convergence of the economy and the ideology. The author calls this network a capitalist economy based on scientific knowledge and steered by technological innovation. (Arocena, 2010) This new network of social power is the basis for understanding the configuration of our social stratification and the relationships embedded in it.

If innovation is understood as a social process in which socioeconomic needs and solving capabilities come together, in the global South, due to the characteristics of the innovation systems, guiding innovation towards social inclusion problems becomes challenging in at least three levels: i. Weak demand for knowledge, ii. Poor promotion of endogenous knowledge generation and opportunities to take advantage of it. iii. Difficulties in linking knowledge supply with demand. (Arocena & Sutz; 2003)

A third factor of complexity is located in the analysis of the convergence of capabilities and needs. Two dimensions are particularly relevant: i. the possibilities of understanding, and ii. the current system of incentives for knowledge generation. The first dimension is primarily concerned with the possibilities of communication and the transmission and translation of needs into research problems. Academic sciences have their particular organization rules, quality criteria, their own periods of time to solve problems and especially their own communication codes. This encounter will differ

depending on the management of these codes by users or the researcher's ability to adapt them. It also differs depending on how mature the transmission of the problem is. The second dimension is related to the absence of incentive mechanisms for researchers to engage in the issues of social inclusion. The current signal system which rewards the knowledge production aimed at topics relevant to publication in international journals skews the possibilities of dedication to issues of social inclusion that are developed in cooperation with users. In the words of Randall and Sutz (2009), working on finding solutions to problems of social inclusion involves additional effort on the part of researchers to combat the traditional mechanisms of incentives and rewards in the academic career which operate in the opposite direction.

To sort these complexities and to bridge the gap between STI results and social inclusion, a possible strategy is to link directly and systemically social policies with STI policies. According to Arocena and Sutz (2010), in recent years, we have been witnessing the emergence of a new approach to STI policies that supports a diversity of undertakings, an example of which is the “Research and Innovation oriented towards social inclusion” program of the University of the Republic in Uruguay. Within this approach a more direct link between the creation of STI and the resolution of social exclusion problems becomes notorious. In this paper, we explore the relationship between STI and the creation of social policy -even at the design stage- in Uruguay.

### **3. The National Care System as an example of demand oriented to STI policies**

Care is defined as the set of actions undertaken by a society to ensure the social and physical survival of those deprived of autonomy and therefore in need of other people to help them when performing daily life activities (ECLAC, 2009). The generation of well-being in our society depends largely on the domestic activities of care developed by families, especially by women. Health care is one of the non-remunerated activities with greater impact on economic and social development and is central to maintaining the social fabric.

The care given or received cannot be treated as a commodity - such as income and wealth - measured by the amount citizens have. “A woman may be as well off as her husband in terms of income and wealth, and yet unable to function well in the workplace, because of

burdens of care giving at home” (NUSSBAUM;2003:53) On the contrary, it is necessary to recognize the existence of several factors that create and reinforce social inequalities.

In Uruguay, the current debate on the NCS is part of the extension of the Social Protection System. This debate recognizes some key factors that cause social inequities, such as: i. Changes in population dynamics that stimulated the increasing demand for care services. Issues like population ageing, low birth rates in middle and higher strata and high birth rates in vulnerable socioeconomic sectors strongly impacted on the size of households, gender relations and thus determined different care needs. ii. Reduction in the available time for conducting this activity due to both the increased participation of women in remunerated activities and their permanence as the ultimate responsible for the completion of household activities. iii. The key role played by care in capacity building at the first stage of life. iv. Quality problems in market-provided care services and v. Lack of access of broad social sectors to both private and public care.

The National Care System aims to socialize the costs associated with care giving tasks to promote shared responsibility not only between families and the State but also between women and men within the household. (Uruguay Social; 2011). The NCS concentrates on three populations: children (with special focus on children from 0 to 3), persons with disabilities and dependent elders. We can find potential examples of technologies and innovations that contribute to the social integration and the health care of each one of these populations.

#### A. Early childhood: Prevalence of child malnutrition.

In the case of early childhood, one of the most critical situations occurs in the persistence of nutritional deficiency. In Uruguay, research studies have reported the incidence of poverty in the growth and development of children. (Amarante et al, 2003; 2007). Surprisingly, despite the characteristics of the country, data shows that in Uruguay the prevalence of stunting in children is much higher than in Chile (2%) ,Cuba (5%) and Costa Rica (6%) (RUANDI; 2007).

Besides the relationship between nutrition and height, proper nutrition in early life is an essential factor for further development of skills. Empirical evidence shows that it is in the

brain and in general throughout the nervous system where we see the consequences of malnutrition. Stoch and Smythe (1963) were the first to propose the hypothesis that malnutrition during the first two years of life may inhibit brain growth and this would produce a permanent reduction in its size and low intellectual development. (Canetti & Schwartzmann, 2010:8)<sup>3</sup>

According to the survey of nutrition and supplementary feeding for children under 24 months, the low consumption of iron and zinc is one of the problems highlighted as a cause of the prevalence of anemia and growth retardation in Uruguayan children. Efforts through the fortification of wheat flour were not enough since they failed to satisfy the iron requirements of children under 24 months (RUANDI, 2007).

Currently, the Ministry of Social Development has incorporated the iron-fortified milk to the “food card” aimed to poor sectors. However, since the consumption of this milk is more expensive and the amount allocated to the cards is fixed, sometimes families choose to consume unfortified milk. In 2006 Arocena and Sutz wrote: “providing public schools with a simple and cheap “nutrition unit,” like a cookie, that can be eaten two times a day and provides all the basic nutrients needed for healthy growth is of paramount importance. A team of biochemists has reached a good solution in the laboratory; from this point onward social policy is needed to organize field trials and lead the way to production”. (Arocena & Sutz; 2006:34) Today, food fortification to reduce child malnutrition is still a problem unsolved in Uruguay.

Some of the strategies used in Latin American countries, for example through programs of conditional cash transfer, are oriented in different degrees to educating with respect to eating habits, to the creation of feeding manuals, the dissemination of information and to the industrial fortification and supplementation of different products with vitamins and minerals<sup>4</sup>. Another strategy is the food bio-fortification processes associated with the development of agriculture and biotechnology. This strategy seeks to impact the diet of the

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<sup>3</sup> See: Stoch MB, Smythe PM. 1963. Does undernutrition during infancy inhibit brain growth and subsequent intellectual development? Arch Dis Child 1963; 68 (202):546-52.

Leiva Plaza B. et al 2001. Algunas consideraciones sobre el impacto de la desnutrición en el desarrollo cerebral, inteligencia y rendimiento escolar. Archivos Latinoamericanos de Nutrición, vol51.

<sup>4</sup> For example the case of Oportunidades in Mexico through Nutrisano supplements to early childhood, and Nutrivida for women during pregnancy.

most vulnerable populations through the addition of micronutrients to basic food crops such as corn, beans, rice, cassava and sweet potato. (Pachón, 2009)<sup>5</sup>

#### B. The elderly and the disabled: the search for quality of life and autonomy

The increase in the elderly population has been a constant in Uruguay, throughout the last century and at present. The population over 60 increased from 2.5% in 1908 to 19% in 2008. The incidence of poverty among this age group is significant, 7.26% of the elderly live in poverty, and 2.82% in extreme poverty or indigence. (Paredes et al, 2010) This situation of social vulnerability is closely connected with the progressive loss of physical and mental skills that reduce the possibilities of living an independent life.

According to the national survey on people with disabilities, in Uruguay 7.6% of the population has some type of disability. Within this percentage, the highest proportion of disabled people is in the 65 + age group. In the capital, the disabled in poverty are 11.5% and the elderly are more exposed to this situation. The superposition of disability, old age and poverty creates a vulnerable scenario for this population. (Bagnato et al, 2011)

The dependence of this population varies according to: i. The presence of difficulties in performing basic activities of daily life that give basic autonomy and independence and enable them to live without requiring support from others (eating, dressing, bathing, moving, etc.). i. Difficulties in performing instrumental activities of daily life, including housework, social activities, and home management (for example telephone use, housekeeping, shopping, meals preparation, use of means of transport, responsibility in the use of medicine, etc...) (Papadopulos & Falkin, 2011)

The NCS establishes that increased autonomy and health care of the elderly and the disabled is a central goal. In Uruguay it is still unclear how this goal shall be translated. Today the service system is fragmented and the public sector cannot satisfy the demand for health care. This is why generally health care, in the long term, depends on the families or the services that can be bought in the market.

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<sup>5</sup> See: Network Biofortification in Brazil, EMBRAPA (2009) [www.biofort.com.br](http://www.biofort.com.br); AgroSalud project in 14 countries in Latin America and the Caribbean [www.agrosalud.org](http://www.agrosalud.org)

There is a variety of technological developments and innovations that contribute to:

i. Reduce the loss of autonomy, ii. Prevent the dependence and loss of autonomy. On the one hand, there is a variety of examples of innovations to reduce the loss of autonomy. In the case of physical disability the best known innovations range from glasses, wheelchairs, kitchen utensils adapted to each type of manual skills, to complex voice activation systems within the home. On the other hand, dependence and loss of independence derive, especially as regards the elderly, from a lack of early prevention of mental and physical diseases. In this respect, we found some examples of STI production aimed at preventing the loss of cognitive and physical capacities such as: Oregon Center for Aging and Technology (ORCATECH) and the MIT AgeLab.

The ORCATECH<sup>6</sup> aims at facilitating successful aging and reducing the cost of health care through: the development of major technologies for independent living, building research infrastructure to support aging and partnerships with industry and academic leaders. This center has developed and implemented monitoring systems through the use of simple technologies such as: motion and activity sensors, bed monitors or home computer-based assessments. These technologies help to discretely monitor the behavior and activities that are important to maintain the health of the elderly and prevent possible diseases and loss of cognitive functions. The information generated can be transmitted to users or others, through a variety of media such as television, personal computers, watches, clocks, telephones, etc. (Kaye, 2011) This kind of innovation contributes to monitor and send an alarm to the users or to their families when they forget to take some medicine.

Another example is the MIT AgeLab<sup>7</sup>; this laboratory suggests that the demographics of aging are a call to innovate. Ageing is an opportunity to imagine new policies, programs, products and services aimed at improving the quality of life of the elderly and the entire population in the future. This laboratory is focused on inventing new ideas and creatively translating technologies into practical solutions that improve people's health and allow them to "do things" over a lifetime.

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<sup>6</sup> See: <http://www.orcatech.org/>

<sup>7</sup> See: <http://agelab.mit.edu/>

The development of engineering applied to health care in the home has a huge potential to increase the degree of autonomy of the elderly and the disabled. The development of these technologies and innovations has not been contemplated in the design of the NCS, at least in its preliminary stage. But, is the inclusion of STI in the NCS likely to be contemplated in the future of these policies? It will be subjected to the capacity of STI to meet the social policies and the problems that they try to solve.

#### **4. Questions and methodology design**

This paper attempts to assess, in the context just depicted, the particularities and requirements of a system of innovation for the National Care System. Three general questions are proposed for discussion: The first two, to analyze the mismatch between social policies and STI policies, and the third to analyze the systemic relationships in the NCS and innovations in health care.

##### 1. From the design of social policies

The passage from the approaches to poverty alleviation to the theories of equity increases the complexity of what social exclusion is and the factors involved in overcoming it. This complexity is transferred to public policy through concepts taken from these theories and through the way they are translated into programs and social policies. Higher levels of complexity are added when we analyze the integration of a STI policy aimed not only at material redistribution but also at the recognition of differences, as Freaser (1997) approaches them: two overlapping dimensions of social justice. The prioritization of the NCS by the Ministry of Social Development in Uruguay illustrates this principle of redistribution and recognition. It is therefore not a trivial question to ask: How do policies, in this case the NCS, define the social problem they address? Within this definition, how does the creation of STI contribute to the solution of the social problem involved? This is vital in order to understand the envisioned solutions and the opportunities to guide the development of STI to social inclusion problems.

## 2. From the design of STI policies

In 2010, Uruguay approved the first STI National Strategic Plan (PENCTI), which recognizes the importance of contributing to social inclusion. However, the STI policy does not include interlocutors from ministries or government agencies that try to solve key demands for social inclusion. The struggles against vulnerabilities, such as ethnicity, class, gender and age are excluded from the agenda proposed by this plan. The recognition of the relationship between STI and social inclusion expressed in the PENCTI is a crucial step. However, instead of joining the effort of social policies, the plan creates a new "space", where the STI appears linked with social inclusion but unrelated to social policies. Due to this mismatch it is quite unlikely that social needs can be satisfied through their convergence with capabilities that enable innovation. Therefore, another relevant question is associated with the STI policy: How is social inclusion conceptualized and what is the role of social policies in relation to the development of STI?

## 3. Map of actors, institutions and relationships

The previous questions are embedded in a complex map of relationships among actors and institutions. Who are the relevant actors and institutions that may configure a system of innovation in health care? What are their relationships? Are there any channels of communication between them? How do the definition of a social problem and the role of STI model the policies' convergence and divergence?

To address these questions, the methodological design should be sequential. An initial descriptive phase addresses two levels: i. The way politicians and technicians working in the NCS define the social problem addressed and the role the creation of STI plays in its solution, ii. The conceptualization of social inclusion in the STI policy by politicians and technicians responsible for the design and implementation of PENCTI. A second stage is the exploration, identification and characterization of the relevant actors, their roles and functions. The reconstruction of this map is essential at a minimum of three levels : i. Level of health care policy and STI policy: objectives, designs, institutions and inter-institutional relations, ii. Level of knowledge supply: research agendas in the field of health care, iii. Level of services supply: Public and private health care services and their relations with STI. Describing these levels will enable drafting the functioning of the innovation system



particularly as applied to health care. This analysis enables the passage to a more analytical response to the following question: how do the definition of a social problem, in this case provided by the NCS, and the role of STI model the policies' convergence and divergence and the structure of the system in general? A third stage is at a micro level, where an example of innovation for health care (applicable to populations and NCS problems) is identified and its journey through the innovation system earlier developed is discussed.

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