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Science and power in the crisis of the European Knowledge Society

Comparing Italy and Great Britain on the case of the GMOs controversy

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Introduction

The relationships between science, politics and society in the field of regulation of biotechnology is the central theme of this research, whose focus, generally, is on the broader connections between the reproduction of social orders and technoscientific knowledge within the current crisis of contemporary democracies.

The current global dimension of the development of technoscience[1] reproduces challenges both for governments and the *governance* of science, and for Science and Technology Studies (STS), in their understanding of the complex connections between the social processes of reproduction of knowledge, power and modern social orders, particularly in the contemporary phase of societal, political and institutional crisis of Western democracies and within the European knowledge societies. In this research I address these issues through the case study of biotechnological regulation and considering mainly the GMOs controversy in agro-industrial sector in Europe that, particularly in ST debates, is considered a very representative field of observation of the current dynamics of normalization of risks and social conflicts of contemporary capitalist democracies, within national and international arenas. I developed this study on the GMOs case through the reconstruction of the European framework of the biotechnology regulation and through the comparison between two European national contexts, Italy and Britain.

It is worth anticipating that I selected these two European countries on the basis of the differences and singularities which I found observing first of all the divergent positions between the Italian and British central government in relation to the development of the GMOs enterprise in Europe and in their own national territories: the Italian state has expressed a policy totally against the production and commercialization of GMOs, sustaining the idea of *zero tolerance* to the spread of these products on the Italian territory mainly on the basis of the lack of scientific certainty and justifying

[1] In this research the notion of "technoscience" is conceived as the linguistic form for defining the different results of modern processes of integration and hybridization between science and technology (S&T) (Rossi, 2005).

and legitimating the political decision affirming the idea of insufficient scientific evidences in relation to the risks that can come from the release of GMOs into the environment. Rather, the central government of Britain is in favour of the affirmation of biotechnological products in the different sectors of application of this hybrid and integrated field of research and development. Through this comparative study for differences, I aim to develop the idea of how, beyond these opposite political results, the basis of the legitimation of both these divergent positions is based on (the domain of) scientific evidence and on the centrality of the questions of scientific risk assessment and management in the dynamics of policy and decision making and in the construction of political and socio-biotechnological networks and imaginaries. Indeed, even if the UK governmental establishment is expressing a policy completely opposite to the Italian government, the definition of this field of research and development and the affirmation/legitimation of political and economic trajectories are predominantly concentrated on the idea of the necessity of developing a policy essentially based on scientific evidences.

In this research I want to investigate how this different trajectories of policies are shaped, justified and institutionally legitimated, intending these processes as crucial dynamics of the construction/reproduction of power and focusing particularly on the mechanisms of legitimation of power and authority, and their actions, discourses and decisions: what is the discursive, cognitive and material structure through which policies and politics finds its legitimation in the development and radicalization of the processes of modernization of risk and knowledge societies?

Considering the centrality of scientific advice and expertise within the structures, dispositives and arenas of policy making, and underling the fact that, for example in the case of GMOs in Britain and Italy, these opposite political results are, in both the national contexts, affirmed on the basis of scientific evidences or on the idea of insufficient scientific evidences, through the analysis of the differences between these two countries, at the same time, I intend to highlight the constitutive, common (to Western and European modern democracies) discursive, material and cognitive basis

of (search of) public legitimation of governmental decisions which is constituted on the modernist and positivist idea of supremacy of scientific knowledge and rationality in politics and policies. Through what relationships between scientific and political agents these decisions are made in Italy and Britain? What are the constitutional implications of these dynamics of scientific legitimation of policies and politics on the democratic processes and state structures? What are the consequences on the dynamics of public participation to the decision and policy making? Through what sort of relationships between science, politics and citizens these decisional processes are developed?

Considering the European framework of the GMOs regulation as the common political, economic and juridical space of the biotechnology policy, through this comparison I tried to identify and highlight the analogies and the mutual dynamics of affirmation of particular relational forms of knowledge and power in the governance of risks within the so called European knowledge societies. Thus, beyond the singularities and the opposite positions and dynamics of development of the GMOs policy between Italy and UK, the main convergent social processes on which I focused in this comparison are presented through the following hypotheses:

considering the GMOs case study as a window from which to look at the current national and international social dynamics of change and, at the same time, of maintenance and stability of the authoritative structures and social order in their relationships with social agents, I addressed and considered these issues through the idiom of the coproduction (Jasanoff, 2004) which I intend to use in order to interpret that process of reproduction of those forms of normative knowledge which determine – in the indetermination which characterizes principally those policies that are defined as risk issues – the regulation and the governance of current public controversies of knowledge societies. these dynamics of co-production are identified through a perspective from which power is conceived in its form of normative knowledge, that form which emerges through the intersections between the scientific, political, economic and, more generally, public dominant visions, contradictions, argumentations, discourses, practices and actions in the social dynamics of the

relationships between social structures and agents within contemporary capitalist democracies. Through the GMOs case study, I shall argue that this form of knowledge-power which reigns, particularly in the risk governance, is mostly the result of these intersections and conjunctions, rather than the expression of the activity and agency of neutral, impartial, objective, independent and autonomous authorities and structures of power. More precisely, through this focus on the coproduced forms of normative knowledge I aim to highlight the obscuration of this same process of co-production through the observation of those dynamics of affirmation of particular order and hierarchy among 'knowledges' which are involved and intrinsically constitutive both in the reproduction of (politico-economic) power and scientific knowledge, in their institutional version of authoritative structures within singular and situated social orders.

From this perspective, both knowledge, and particularly the reproduction of scientific knowledge, and the predisposition, affirmation, disposition and exercise of (governmental) power are conceived as part of the same process of ordering knowledge and societies in the current dynamics of socio-technoscientific change and innovation, and, at the same time, in the *necessity* and *emergency* of stability of contemporary late-modern social orders. In this study I intended to show how these forms of coproduced knowledge-power result to be obscured through a process of scientification of policy and politics in the biotechnology field of regulation. The scientification, which produces the obscuration of the co-produced forms of normative knowledge that, rather, rule in the GMOs controversy, consists in a complex, deep and constitutive process of translation of political issues and social conflicts into matter of scientific (risk) assessment and management. The obscuration of the dynamics of the co-produced normative knowledge, which occurs through the scientification of biotechnology policy, emerges from the fact that particularly in these kinds of controversial issues the scientific authorities are identified as the exclusive or predominant actors and arbiters (Doubleday, Wynne, 2011) able to rule in the determination of public decisions about risk. In this domain of scientific knowledge in risk policies, and in the definition, specifically, of the GMOs regulation as a *science-based* policy, and also in the fact that political decisions are legitimated on

the basis of the claim of scientific neutrality and objectivity, I see the obscuration of the processes of coproduction of normative knowledge. Furthermore, in this study I argue that these dynamics of scientification/obscuration of politics and policies behind the definition of scientific matters produces, deliberatively or not, a process of alienation of extra-scientific crucial aspects which are however involved in the reproduction of the biotechnology enterprise, and an alienation or an exclusion-subordination of public rationalities, reasons and concerns which, very often, in risk controversies result to be in conflict with the dominant trajectories of development predisposed through the ideology of the superiority of scientific knowledge.

Considering these elements as the crucial argumentations of this comparative research which is both on the singularities and analogies between the Italian and British biotechnology case, in this introduction of the questions, contents and guiding hypothesis of this research, I intend to emphasize the element of the situatedness[2] (Haraway 1988; 1998) of knowledge and those frictions[3]

[2] Following Dona Haraway, the idea of situatedness of knowledge represents a critical view and a problematisation of the concept of (scientific) 'objectivity', 'neutrality' and 'universality' (of human knowledge), and a way to highlight the complexity and criticality of the social processes of the affirmation of objectivity of science as the principle that orders reality – as an implicit and explicit motor of, at the same time, change and stability which works reducing and separating the natural and cultural worlds in objects of knowledge-power, and thus as the major dispositive of human domain of modern authoritative structures that are constituted on these scientistic ideologies of scientific knowledge as the 'promethean regenerating fire' and instrument-end of human domination of the world. In this research I argue that in the situatedness of the intersections between scientific knowledge and the reproduction of power and social orders, objectivity and universality constitute the basis of the legitimation of power, working as that ideology which affirms the supremacy of scientific knowledge and rational knowledge. In these terms, Haraway, in her theory of "situated knowledges", argues that the idea of full objectivity and universality of "*science – the real game in town, the one we must play – is rhetoric, the persuasion of the relevant social actors that one's manufactured knowledge is a route to a desired form of very objective power. Such persuasions must take account of the structure of facts and artefacts, as well as of language – mediated actors in the knowledge game. Here, artefacts and facts are parts of the powerful art of rhetoric. Practice is persuasion, and the focus is very much on practice. All knowledge is a condensed node in an agonistic powerfield. (…) The form in science is the artefactual-social rhetoric of crafting the world into effective objects. This is a practice of world-changing persuasions that take the shape of amazing new objects – like microbes, quarks, and genes. (…) I, and others, started out wanting a strong tool for deconstructing the truth claims of hostile science by showing the radical historical specificity, and so contestability, of every layer of the onion of scientific and technological constructions, and we end up with a kind of epistemological electro-shock therapy, which far from ushering us into the high stakes tables of the game of contesting public truths, lays us out on the table with self-induced multiple personality disorder*". (Haraway 1988, pp. 575–599) Through this perspective, the idea of situated knowledges represents in this work a window through which to look at the current dynamics of radicalization of the conflicting relationships between the domain of technoscientific knowledge – in a sort of abdication of the political power – and the singular, local 'popular' cultures and knowledges (Benasayag, Sztulwark, 2002) that, following this tangle of thoughts, are conceived in this study as 'subjugated knowledges' (Foucault, 2003b) and as: "*(…) a way of playing local, discontinuous, disqualified or nonlegitimized knowledges off against the unitary theoretical instance that claims to be able to filter them, organize them in the name of a true body of knowledge, in the name of a rights of a science that is in the hands of the many*". (Foucault, 2003b:9)

[3] Frictions that mean, at the same time, invisible and more explicit conflicts between the forms of 'lay' knowledge and expert knowledge, within the mechanism of power and in the reification and sacralisation of scientific knowledge in the

which are involved in the reproduction of technoscientific knowledge and the ordering of the social structures of power in their relationships with citizens.

> We wanted a way to go beyond showing bias in science (that proved too easy anyhow), and beyond separating the good scientific sheep from the bad goats of bias and misuse. It seemed promising to do this by the strongest possible constructionist argument that left no cracks for reducing the issues to bias versus objectivity, use versus misuse, science versus pseudo-science. (…)So, I think my problem and 'our' problem is how to have simultaneously an account of radical historical contingency for all knowledge claims and knowing subjects, a critical practice for recognizing our own 'semiotic technologies' for making meanings, and a no-nonsense commitment to faithful accounts of a 'real' world, one that can be partially shared and friendly to earth-wide projects of finite freedom, adequate material abundance, modest meaning in suffering, and limited happiness. Harding calls this necessary multiple desire a need for a successor science project and a postmodern insistence on irreducible difference and radical multiplicity of local knowledges. We don't want a theory of innocent powers to represent the world, where language and bodies both fall into the bliss of organic symbiosis. We also don't want to theorize the world, much less act within it, in terms of Global Systems, but we do need an earth-wide network of connections, including the ability partially to translate knowledges among very different – and power-differentiated – communities. We need the power of modem critical theories of how meanings and bodies get made, not in order to deny meaning and bodies, but in order to live in meanings and bodies that have a chance for a future (Haraway, 1988:575–599)

Taking into account this approach of the situatedness of knowledge, this work – as well as any other form/production of knowledge – emerges (through the observation of processes and phenomena)

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reproduction of the legitimacy of modern authorities; this is ultimately because: "*science has been about a search for translation, convertibility, mobility of meanings, and universality – which I call reductionism, when one language (guess whose) must be enforced as the standard for all the translations and conversions. What money does in the exchange orders of capitalism, reductionism does in the powerful mental orders of global sciences: there is finally only one equation. That is the deadly fantasy that feminists and others have identified in some versions of objectivity doctrines in the service of hierarchical and positivist orderings of what can count as knowledge. That is one of the reasons the debates about objectivity matter, metaphorically and otherwise. Immortality and omnipotence are not our goals. But we could use some enforceable, reliable accounts of things not reducible to power moves and agonistic, high status games of rhetoric or to scientistic, positivist arrogance. This point applies whether we are talking about genes, social classes, elementary particles, genders, races, or texts; the point applies to the exact, natural, social, and human sciences, despite the slippery ambiguities of the words objectivity and science as we slide around the discursive terrain*". (Haraway, 1988:575–599) Following Haraway argumentations, this point represents also the reason for which in this research I intended to study about the development of genetic engineering as a representative case of domination of the scientistic and positive ideology of supremacy of the scientific objectivity on the other forms of knowledge which result, in this mechanism, to be alienated, subordinated and subjugated: in the GMOs controversy this character is particularly visible in the transversal definition of public (political and social) concern, skepticism and mistrust as a sign of the irrationality of citizens, and as irrelevant subjective and partial opinions and suggestions incontrovertibly with less normative values than 'scientific evidences': in this mechanism, it seems that it is increasing appearing a process of subtraction of the value of other forms of expertise and knowledge, especially when the firsts result to be in conflict and opposite to scientific knowledge.

within a particular political and cultural context, in a specific historical period, and into a specific socio-political-economic order[4].

Situating the observations and the ideas proposed in this research, these emerge within a – historical, political, cultural – scenario which is socially defined by the idea of crisis, particularly in Europe and in the Western world: contemporary societies are represented as governed by institutions besieged by deep and constitutional crises which seem to undermine the foundations of the types of legitimacy through which modern authorities have been established, power has been reproduced and the social order maintained and guaranteed. Crisis is the word – in the dominant discourses of globalising societies – which describes the social change of Western civilization, from the modern world to a historical phase definable for its indefinability and uncertainty: the crisis in and of modernity that changes. Market crisis, financial crisis, the economic crisis of nation-states and the crisis of international financial institutions, environmental crisis, political crisis, and the crisis in science and technology, social crises.

Thus, risk, uncertainty and crisis are the general characteristics by which current societies are represented – both in the common sense, and in philosophical and sociological analyses, with particular regard to those sociological approaches where the connotation of reflexivity of the current processes of modernization is a central characteristic in the reproduction of current social realities and where this feature of reflexivity appears strictly connected to the explosion of the risk and to the radicalization of the phenomena of modernization of the first phase of modernity (Beck 1986). In this diffusion of social imaginaries and scenarios of uncertainty, contemporary structures,

[4] In this comparative research, studying the power relationships which emerge through the preordination of scientific knowledge on the other forms of knowledge, within current democracies, and using the perspective of situatedness of knowledge, I tried to connect the social study of power to the exploration of scientific knowledge emphasizing Haraway's idea of situated knowledge and its links with the conceptualization of Foucault of "*existence of different knowledges, which existed with their differences – differences defined by geographical regions, by the size of the workshops, or factories and so on. The differences among them – I'm speaking of technological expertise – were defined by local categories, education and the wealth of their possessions…. At the same time, we saw the development of processes that allowed bigger, more general and more industrialized knowledges that circulated more easily, to annex, confiscate and take over smaller, more particular, more local artisanal knowledges*". (Foucault, 2003a:179) Through the GMOs case study I aimed to consider those invisible relationships between glocal forms of technoscientific knowledge and governance and the local and singular implications of the development of this dominant knowledge-power on the situated social and political realities.

organizations and institutions, at the state and supranational levels, are qualified as in crisis in their expression of apparatus of power and authority.

Ultimately, it is a crisis of legitimacy of modern authorities and an increasing loss of shared sense and meanings, in a situation of ever less actual and effective power of nation states and, more generally, a dispersion (invisibilisation) of political power, in an ambivalent movement of centralization – in several centers – of particular forms of power and normative knowledge on the subjects, and through a sort of disintegration of the spaces of public politics within the reproduction of techno-financial systems. In the global governance of risk and crisis, the current formation of technical governments (as in Italy or in Greece), which are constituted in order to manage the crisis, represents a visible sign of the radicalization of the modern linear model of science in politics, through a scientification of polity, in the global neo-liberalist governance of "the State of development" (Laclau 2005; Laclau, Mouffe 2001).

From the standpoint of this research, from a situated and reflexive perspective, the crisis consists, in its very often invisible and obscured dynamics, in the ongoing constitutional self-confrontation with the idea of the primacy of human rationality in the domain of nature and the principle of scientific division and rationality impressed through the Enlightenment model of human and social development. These dynamics of crisis are expressed through the diffusion of public concerns and mistrust about – on an abstract level – the modern model of development and progress supported by the super-ordination of this technoscientific disposition of modern social orders.

I shall argue that, considering the affirmation of the state of emergency (Agamben 2004) and crisis of contemporary European democracies as the paradigm of government of the risks and crises reproduced through the processes of modernisation, the relationship between technoscience and politics is represented – taking into account the crucial importance of media in such relational processes – through the current role of the technicians-politicians which seem to be situated, in these states of normalization of the emergencies and crises, in a critical and controversial

relationship with citizens. In this technoscientific domain of politics, the foundations of both the modern legality and the legitimacy not only of politics, but also of science – following the principle of division and independency of roles and competences between political and scientific communities and the barriers imposed by modernity – are being undermined; particularly, if we consider the fact that, on the one hand, science is acting as a political agent, and, on the other hand, public policies are legitimated predominantly on the basis of technoscientific grounds, alienating and excluding citizens and, more generally, extra-scientific forms of political and social rationality.

Especially in the policies of risk, emergency and crisis, "lay people" and social structures are imagined ever more ultra-reliant on science, and, at the same time, for the high complexity and scientification of risk issues, lay citizens tend to be not included particularly in those processes of regulation, reforms and in the technical manoeuvres where urgency and emergency are considered the norm, and where any element of irrationality, including social resistance or public mistrust, can represent a 'risk' for the reproduction of public order. Ambivalently, through the diffusion and radicalization of social reflexivity on the 'dark shadow' of the risk and emergency of the processes of modernisation, while scientific and technical developments arises simultaneously as political struggles and as reasons of political crisis and governmental delegitimation, policies and politics are however increasingly based on technoscientific domain. In this sense, the legitimation both of political and scientific actions and decisions is made to derive from the independency and autonomy of technoscientific bodies from the social and political sphere, and from a sort of neutral agency of political and governmental institutions which act through a delegation of their power to technicians, experts and scientists in managing current crises.

Particularly in the crisis of European countries and within the European Union (EU), The policies and current governments made by the *neo-demiurges* of contemporary society are developed within a diffuse crisis of legitimacy of public institutions, both technoscientific and political structures and authorities, which goes beyond the field of policy relating to the risk regulation. Nevertheless, the

technoscientific assessment and management of the current economic and financial crisis, as a sign of (re)affirmation and reinforcement of the linear model of technoscience in policy and decision making, is established through the claims of governments of strong sacrifices for the democracy and for the European populations in the name of a safer and better future. In this critical phase, through the mechanisms of technoscientific management of the crisis in Europe, the scientific and political institutions are expressing a very strong need of public trust, credibility, nevertheless in the affirmation of the rhetoric of the necessity of creating states of exception from the 'normal' democratic course of policy-making in order to govern the crisis and to develop those policies, decisions and interventions finalized to implement the necessary reforms which the progress of knowledge societies requires. Looking at this macro-context of crisis through the lens of the relationships between science, politics and citizens and from a situated perspective, I considered the GMOs case study as particularly representative of these dynamics of scientification of the governance of risks and crises in current knowledge societies.

Following this reflection, through the case of the regulation of biotechnology in Europe the main questions are: what are the constitutional implications and consequences on contemporary democratic systems of the affirmation and/or reinforcement of these forms of state of emergency and technoscientific-financial domain? Within these critical dynamics of governance of risk and crisis, how can be explained the intricate and constitutional relationships between technoscience, politics and citizens in the reproduction of the imaginaries of crisis of knowledge societies? How does the scientification of politics and policy, deliberately or not, obscure those constitutive processes of co-production of normative knowledge (Jasanoff 2004) through which current social orders are reproduced? What are the implications of the scientification of politics and policy on the democratic systems, and on the dynamics of public participation to decision and policy making?

Starting with these questions and from the perspective introduced so far, the work presented in the following pages constitutes a summary of the full Italian version of this doctoral thesis. Therefore,

the structure of this dissertation, compared to the full Italian work, is reproduced as follows: in both the versions of research, the first part, where I developed the theoretical and methodology framework, and I presented the case study and the elements of the comparison between Italy and Britain, coincides, as well as the last part that is, in the Italian and in this English summary, dedicated to the comparative analysis and the conclusions.

Instead, the analysis of the international and European dynamics of regulation of GMOs, the formation of public debates and social controversies around biotechnology, and the study of the two national contexts of comparison, which I developed in the Italian version of my doctoral research, are not included in this dissertation. Considering these differences, in this synthesis, in order to make the whole structure and perspective of this research more understandable, I have included a number of references to the Italian version, and it may be worth saying that the three central chapters of the Italian versions, relating the topics mentioned above (the international and European normative and political context of GMOs regulation, the emergence of risk social imaginary and the profusion of risk events, and the study of the two national case studies), are presented in this dissertation just in form of outline of the main contents developed more extensively in the full Italian version of this research.

Hypotheses, objective and *outline* of research

In this work I tried to explore, by a theoretical and empirical reconstruction, the dynamics of coproduction of those forms of normative knowledge (Jasanoff 2004) and power which emerge through the constitutive relationships between scientific and political authorities in public sphere, and particularly in those fields of policies that are defined, within the cultural, political and legal framework of current European knowledge societies, as matters of (scientific) risk assessment and management. As I introduced so far, the GMOs controversy is the case study through which, for its high representativeness (Bucchi, Neresini, 2006) of the globalising public controversies of late

modern societies, I developed the empirical analysis of the European regulation of risk policies, and particularly the comparison between the normative processes relating to the agro-industrial sector of biotechnological application in Italy and Britain.

With particular regard to the last three decades, within the international dynamics of the global market and trade, in Europe has been said that it had no choice but to accept agro-biotech, mainly because the technoscientific market of biotechnological innovations has been introduced as a global emergency and necessity for and in the dynamics of development of knowledge societies. Thus, this imperative, which became particularly salient in Europe since 2003-2004[5], can be interpreted, as it is presented by the international and European institutions of government, as a sort of "*test of democratic accountability for societal choices*" (Levidow, Carr 2009). Within the public debate around the GMOs controversy, the EU has taken a position of promoter and defender of agro-biotech enterprise as a necessity and an emergency for the economic and social development of European populations, for the success of national states and for the progress of the Europe knowledge society; but in any case justifying its own defensive reasons pro-GMOs mainly on scientific ground, centralising the policy on the processes of scientific risk assessment and management, and legitimating economic trajectories and political actions and decisions through scientific argumentations and approaches.

In this study, I shall argue that the regime of the GMOs regulation oscillates between the affirmation of a state of emergency, if we consider the centralisation of the EU processes of policy

[5] It is worth underling here that since the 2003-2004 the European position of caution and the *de facto moratoria* to the production and commercialization of the GMOs products in Europe have been suspended, particularly under the pressures of the WTO and especially of Argentina, America and Canada, and the GMOs policy in Europe, with particular regard to the production and commercialization of GM seeds and foods, has been developed through a renewed approach to biotechnologies as a necessary field of research and development for the future of European 'developed' countries. This change and trajectory places the EU's approach to biotech enterprise closer particularly to the USA GMOs policy, which has been developed on the basis of the (juridical-scientific) principle of *substantial equivalency* between GM and traditional products. Furthermore, both the European directions of the GMOs regulation – its more cautious and original position and its subsequent opening to biotech products – have been sustained and justified on the basis of a scientific ground: in the first case assuming the fact that there were too little scientific evidences to take the risks of releasing GMOs into the environment and in European agro-industrial circuits, and in the current phase authorizing some GM products on the basis of the positive scientific evidences which are claimed to be emerged so far, from the international scientific community, as the proof of a sustainable level of risk of the spread of specific GM products.

and decision making predominantly on mechanisms and dispositives of scientific assessment and management of biotech risks, and, on the other hand, the unfolding of a state of necessity: in the last decades, in Europe biotechnology and GMOs are presented as a necessity, as a field of research and development which is fundamental for the progress ultimately of human being.

The result of this process which I intend to highlight in this dissertation is the affirmation of a state of emergency and necessity as paradigm of government of the European biotechnology policy and governance, and, more generally, as the paradigm of government of risks policy and crises of late modernity in contemporary capitalist democracy. In this shift, I shall argue that there is an obscuration of those dynamics of coproduction of normative knowledge trough which, rather, the processes of the GMOs regulation are reproduced, that is through the hybridisation between scientific, political and juridical authorities, which legitimacy is reciprocally constructed paradoxically on the basis of the claim of their autonomy and independency.

Within this ambivalent and oscillating regime of regulation, which is entrapped between explicit and more implicit economic and political interests and scientific disposition of public debate and policy, the GMOs controversy is characterized by deep and challenging social frictions. These are expressed through the dimensions of public doubts, suspicious, scepticism and disputes about the safety and the effective benefits[6] of biotech products, particularly in relation to the decisions about

[6] An example of the typical political rhetoric on which I'm focusing in this study is easily traceable particularly through the discourses of the GM-lobby, in Europe, and specifically in Britain, where the idea of the necessity of implementing the biotech enterprise for the development of the country and for the future benefits of GMOs regards first of all the specific attitude of the British government. This is readable in the following assertions and positions of a British politician which are reported by the newspaper *The Guardian* on the 3th January 2013: "GM food: British public 'should be persuaded of the benefits'. (…) Owen Paterson tells farming conference that GM offers great opportunities but public must be reassured of safety Environment secretary. (…) Paterson, the Conservative secretary of state for the environment and who has chosen to highlight GM technology in his first major speech to farmers, will tell the Oxford Farming Conference: '*We should not be afraid of making the case to the public about the potential benefits of GM beyond the food chain - for example, reducing the use of pesticides and inputs such as diesel. I believe that GM offers great opportunities but I also recognise that we owe a duty to the public to reassure them that it is a safe and beneficial innovation.*'". At the same time, in this rhetorical and discursive expression of power in the biotech regulation the focus is on the character of risk and emergency of GMOs issue, and on the necessity to follow the "rigorous processes" of scientific management and technoscientific procedures are identified as the fundamental basis of legitimation of policy: "'*…making the case at home, we also need to go through the rigorous processes that the EU has in place to ensure the safety of GM crops*'". (*The Guardian*, 3th January 2013) The discursive and material dispositive of power-knowledge which governs in the GMOs regulation in Europe, with particular regard to the conflicting controversy between the polarized positions pro and against GM food, seems to be peculiarly represented by the current debate in Britain, and in

the introduction of GMOs in the European agro-industrial chains of production and distribution; thus, through relational forms which create the conditions for a crisis of credibility and legitimacy for governmental institutions and political and scientific authorities. The diffuse social resistance to GMOs, producing social conflicts and public mistrust, is part of the reasons for which the GMOs regulation is constructed on the basis of a regime of necessity and emergency. Furthermore, in a conflicting contest and in a crisis of political and scientific legitimacy, the GMOs policy is reproduced through the pressure and necessity of European and national governments of reframing their structures and policies in order to regulate these new techno-industrial fields of research and innovation in life sciences. This political, juridical and economic exigency of facing the challenges of biotech innovation within local territories, cultures, and legal systems, due to the international diffusion of these controversial and emerging scientific enterprises of genetic engineering, is very often presented within public debate as an exigency for the promotion of a new age of human discovering, development and progress, with all the unpredictable implications and risks that any profound innovation and change can imply.

In this study I consider these mechanisms of affirmation of the state of emergency and necessity in the GMOs case as that implicit dynamic, in risk regulation, through which the processes of co-production of normative knowledge and hybridisation between political, scientific, juridical, and economic subjects are obscured: the state of necessity and emergency is produced, legitimated and justified on the basis of the affirmation of a dynamics of scientification of the GMOs policy. In this sense, I intend to consider how the scientification of the GMOs policy and decision making, being sustained through these mechanisms and dispositives of suspension of the rule of law dictated in turn by the institutional definition of a situation of necessity and emergency, produces the

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this sense, from a comparative perspective and through the confrontation with the Italian context, I argue that the British case is particularly close to the European framework of regulation: these common mechanisms, discourses and courses of actions seem to be sustained through the affirmation of a state of emergency, in terms of the centrality which is conferred to the GMOs risks and emergencies and to the scientific management, and on the other hand, through the affirmation of the idea of economic necessity of developing this sector of innovation, endorsing and affirming a commercial perspective of science and at the same time a vision of technoscientific knowledge as the basis of legitimation of the processes of decision and policy making.

obscuration of the relationships of co-production of that form of knowledge-power which emerges through the intersections between all the spheres of social actions, that rules in the dynamics of social change and in the maintenance of social order, and which is invisibilised through the establishment of a sometimes implicit, and sometimes more explicit states of emergency.

Where and how is this state of necessity and emergency discursively and materially reproduced? And how is the coproduction of normative knowledge obscured through this regime of the GMOs governance? The GMOs controversy is developed on a global dimension, but at the same time it can be observed through the singularities and considering the social and public impact of this issue on the national and local contexts of biotech regulation. In this sense, strictly connected to the political decisions and economic directions of EU biotech policies, on the international level, the World Trade Organisation (WTO) and other globalizing spaces of policy-making are interpreted in this study as those places where the government of GMOs is constituted through the affirmation of the state of emergency and necessity, scientifising the policy and obscuring the intricate relationships between national and supranational *technoscientific-political-economic* entities which are involved in the reproduction of the knowledge and social order of GMOs.

In the different, hybrid and multilevel public spaces where the co-production of normative knowledge occurs it is possible to observe the continuity and contiguity between the scientific, political and economic fields of social actions, in the governance of knowledge globalising societies: a dynamics of weaving and hybridization between the ‘separate’ spheres of modernity which are emblematically shown through the GMOs case study. In fact, the biotechnological enterprise arose as a technoscientific-economic venture; this is its main structural and constitutive characteristic in its different fields of application: since 1975, firstly in America, ‘genes factors’ have been created for the production of GMOs which occurs very often within technoscientific laboratories that are embedded in the structures of capitalist private companies. Furthermore, at the core of the biotechnological enterprise, as it has been discursively reproduced so far in the

international debates, there is the commercial connotation of GM products, which consists in the promise of high economic profits and competitive advantages and in the rhetoric of deep human and social development and progress through the domain of future biotech imaginary.

At the same time, with particularly regard to this emphasis on the future, the GM products are reproduced through the character of uncertainty and risk, and in a general and diffuse public mistrust and skepticism which create several problems to the commercial development of this field of technoscientific innovation. In fact, strictly connected with the idea/promise of future deep human progresses, innovations and changes, the GMOs and biotechnology field of research and development emerged through (scientific, political and social) public skepticism, doubt and various social conflicts because of the risks that may result from the development of these technologies and by the release of these products into the environment. The semantic web of the biotechnology controversy consists of imaginaries of insecurity and uncertainty about the implications of the spread of GMOs in the environment on traditional plant breeding; imaginaries of dangers described as Frankenfoods; disputes about the domination, in this field of policy, of the control agents of multinational companies; scientific risk controversies which simultaneously arise as political troubles and dilemmas.

Concerning the dynamics of authorities' legitimation in this phase of crisis, through the GMOs controversy as a very representative case study of the current public hybridised (Latour, 1994) controversies of risk and knowledge societies, I develop this study addressing the idea that the regulatory procedures of GMOs assessment and management – in ways which open up future social imaginaries of risk, but also scenarios of future economic growth and development – are reproduced in a legitimacy crisis, leading to national policy and political changes, as well as generating and putting in action different strategies to regain public legitimacy – the legitimacy of both the political and the scientific authorities.

From the perspective of this work, these several actions and strategies of policies of some national governments and in the EU framework are interpreted as a visible sign of the institutional emergency of reconstructing public trust and as the need to respond to social conflicts and resistances to certain processes of development and progress, particularly if we refer to those experiences defined as the approaches of *public understanding of science* and *public engagement of science*. I consider these areas of policies, ultimately, as a product of the predominant (and criticised by many) model of 'democratic deficit' through which the relationships between citizens and science in politics have been interpreted in the last decades in western democracies. The 'deficit model' has identified the dynamics of communication/information between science and citizens as the crucial dispositive through which to increase the level of democracy in 'scientific' public issues. This means that the problems of democracy which are recognised through this approach of science in public policies is focused on the idea that if 'lay' people are more informed and acknowledged in the matters and contents of science, the social resistance to the development of scientific innovations can be decreased. Nevertheless, as the critical positions to this model have pointed out, the deficit model – which interprets the relationships between science, politics and citizens, in the crisis of legitimacy of both governmental and scientific authorities, as a question of lack of information and education to scientific knowledge and method – is conceivable, from the perspective of this research, as a sort of 'trap' for the democratic development of the relationships between citizens and authoritative structures: this is mainly because through this approach public is represented as an non fully rational corpus which can be made rational and able to understand public issues (particularly those which are defined institutionally as scientific issues) only if it is pushed in the condition of reading the reality through the same lens of technoscience.

Considering the affirmation of the idea (and also of the criticism) of deficit model in academic and public debates, the experiments of public understanding of science and its evolution in the public engagement with science are interpreted in this research essentially as strategies of regaining public consensus around controversial issues, which produce social conflicts and that emerge from the

reproduction of conflicting and different cultural meanings about particular critical processes of research and development. In this sense, the comparison between Italy and Britain represents a methodological instrument in order to show how when the necessity of gaining public consensus is not among the priorities of governmental institutions, these experiments of public understanding of science and public engagement of science are not followed with the same intentions and commitment by the national governments. In Italy, where the public position and the governmental decision on the GMOs go in the same trajectory, the state has not development the exigency and necessity of implementing these mechanisms of engagement of public in the GMOs controversy. Rather in Britain, where the social resistance to GM products is in deep contrast with the position expressed by the central government of UK, these experiments of policies characterise peculiarly the development of the GMOs policy in this country. Connecting this perspective to (the critical aspects of) the deficit model, I conceive these current developments in the forms of public participation in policies as an attempt to restore the 'original' democratic deficit which emerges through the scientific unfolding of public decision and policy making, with particular regard to risk issues. The re-integration of 'lay' citizens within the institutionalised arenas of public participation in policies, their engagement in public debates with science and about science, these forms of search for public consensus around risk controversies, are interpreted in this research as a sign of the general and 'normal' alienation of extra-scientific reasons and knowledge, through the scientification and domain of technoscience in politics, from the main arena of policy and decision making; particularly in the GMOs case. In this bias, expressed by the necessity of reintegration of public in the scientific realm and institutionalised forms of communication between science, politics and citizens, I consider the current situation of risk and crisis management as supported through discourses and practises of scientification of polity: very often invisible and sometimes explicit dynamics of scientific despotism, in the reproduction of social orders through the affirmation of states of emergency.

This scientification is, deliberatively or not, developed by forms of implicit, tacit (very often taken for granted) forms of scientism and practices of 'scientific despotism' (Doubleday, Wynne; in Jasanoff 2011) which emerge in the democratic deficit fuelled by the radicalisation of the scientific definition and domain of policies in the diffusion of emergencies and risks. This process of scientification of policies, through the conjunction of the scenarios of risk and knowledge societies, has the consequence of disposing the public debate through a position of subordination in the super-ordination of technoscience over any other forms of human knowledge and rationality. On a general level, this disposition can be observed particularly within the different and more or less institutionalised arenas of public debates and decision making through the attitude of the diverse (economic, political and scientific) stakeholders involved in the GMOs policy, in the different national and European contexts, of justifying and legitimating their own positions and commitments concerning biotechnology enterprise predominantly on the basis of scientific arguments, and thus emphasising the polarisation of this dispute through a dichotomist vision which is focused on the distinction between *sound science* and *weak science*, as the exclusive yardstick and method of discernment in the policies of risk.

At the same time, although the increasing scientific domain in politics and policies is reaching the highest level in the affirmation of the idea of knowledge societies and with the establishment in Europe of technical governments, in the case of biotechnology, the crucial, constitutive and entangled relationships between scientific, social, political and economic interests, commitments, alliances and conflicts are alienated and rendered invisible by the definition of GMOs predominantly as a scientific matter, and by the disposition of technoscience, in the radicalisation of the linear model of policy-science relationships, as the principal competent agent in order to form a strategy of policy. In this scientific domain, the several and variegate attempts by European and national governments of regaining public legitimation, particularly in relation to these kinds of issues of *scientific governance* and *governance of science*, might show how, even in this scientific

domain, it seems to resist a critical dimension of reciprocity[7] between science, politics and publics, in both the processes of legitimation of scientific authorities and scientific knowledge and in the reproduction of political and governmental institutions of power. On the one hand, the institutional search for public trust, as if it can mean public consensus and, on the other hand, the diffusion of social conflicts make visible the obscured social character of the co-production of normative knowledge in the biotechnology controversy, and express "*into a sociological form*" the relationships "*of superordination and subordination*" between fields of knowledge in the affirmation of the risks of knowledge societies.

These (invisibilised) co-produced processes are interpreted in this research as a conjunct movement of both social change and creation of social and public stability, through the intense motor of technoscientific innovation. This juncture is observed particularly through the perspective of the co-production of those forms of normative knowledge through which current social orders are continually reframed, and in this observation the aim is to highlight the invisibilisation of these dynamics of co-production, through the scientification of policy and politics.

Closely linked to that, in this study particular attention is focused on the constitutional forms, the implications and consequences of this dynamic of scientific domain in policies, especially on the

[7] One of the theoretical conceptualizations that can be mentioned here to explain this relational process and social disposition of power (in this case between forms of knowledge) is the analysis of Georg Simmel (1896) of the social relationships of superordination and subordination, particularly in his study of forms of social conflicting relations. The focus is on the category of *reciprocity* in social conflicts. He addressed the idea that all relational forms of subordination and superordination are based on the element of *reciprocity* in the (conflicting) relationship itself. Hence, in Simmel's dialectical view – which takes into account the Hegelian philosophical tradition of the dialectical dynamic of power between the categories of *master-slave* and the irreducible dimension of reciprocity even in this relationship of domination – social conflict necessarily involves reciprocal action and therefore is based on reciprocity rather than unilateral imposition. In his chapter on "Superordination and Subordination", power "*conceals an interaction, an exchange …. which transforms the pure one-sidedness of superordination and subordination into a sociological form.*" Thus, the superordinate's action cannot be understood without reference to the subordinate, and vice versa. And this is a social (sociological) concern: *superiority and inferiority is [...] one of the forms in which "society" comes into being. It is one of the manifold interactions between individuals, the sum of which we designate as the socialization of the individuals concerned.* (Simmel, 1896: 169) See "Superiority and Subordination as Subject-matter of Sociology II", *American Journal of Sociology* 2, (1896): 392-415. In this research, this perspective is used in order to take into account questions of *reciprocity* (between fields of knowledge production) in the process of the social reproduction of hierarchical structures and boundaries between forms of knowledge. In a way, following Simmel's view and extending it to the relationships between forms of knowledge, through his use of the category of reciprocity it is possible to highlight the *social* character of technoscientific production, even considering its super-ordination in the hierarchical structure of knowledge-power through which social orders (of knowledge) are reproduced.

democratic systems of the current crises of modernity in the management of risk controversy, as the GMOs issues is mainly institutionally and socially framed. In this regard, on the one hand, the focus is on the forms of alienation of citizens from the main public arenas of decision and policy making, both on a discursive level and through practises of scientific definition of the relevant issues, main evidences and facts which are placed in contrast with the idea of irrationality of public opinion and with the subjective plane of public judgments. On the other hand, the attempt is to underline the invisibilised dimensions of political, economic and scientific commitments, interests and relationships, involved in the decisions relating to the products and applications of genetic engineering, which are hidden behind the disposition of the GMOs debate and regulation predominantly as a matter of scientific assessment and management, although commercial, scientific and political alliances, in the network of the GMOs controversy and in the hybridisation of these fields of social actions, constitute the foundation of the development of the European and international GMOs regulation and strategy.

Nevertheless, the elements of reciprocity in this scientific domain, which make these relationships as social and in a societal form, reappear, in the GMOs case, in the manifestation of the scientific and political exigency of public legitimation and credibility: this is more visible through the diffuse and general scepticism, opposition and public resistance to the GMOs' practises of regulation, and in the consequent institutional attempt to regain public consensus, even if the policy is institutionally claimed to be managed predominantly on the basis of scientific evidences. In this sense the non fully recognised social dimension and the reciprocity between the dynamics of knowledge's and power's reproduction results from the idea of public engagement with science and particularly in the promotion of the participation of citizens to the formation of socio-biotechnological imaginary, in the institutional exigency of managing social conflicts, however reinforcing, deliberatively or not, the biotechnology network.

Ultimately, the processes of co-production of normative knowledge and normative systems of risks and crises regulation seem to be hidden behind the scientific disposition and unfolding of the politics and policies of governments, and thus behind the processes of legitimation of the political decisions of emergency and risk through the independency and autonomy from which the scientific authority is made to derive, theoretically and in practise: essentially from the supposition of the 'nature' of externality and neutrality of technoscience in relation to political, social, economic and cultural aspects of scientific knowledge and innovation reproduction.

From the perspective of this work, the definition of 'scientific risk policies', making invisible the processes of co-production of normative knowledge, limits public debate and policy-making, and reduces the huge and variegate questions that arise through the GMOs controversy to an exclusive or, at least, dominant matter of technoscientific competence. Also, as the GMOs enterprise is treated simultaneously as an emergency and a necessity, in this kind of controversy the crisis of legitimacy comes from the invisible suspension of the 'normal' democratic course of the formation of public debates and decisions, by the application of a state of emergency and necessity (Agamben 2004) as the paradigm of government, which is justified by the constitutive definition of the regulation of GMOs as a risk and emergency policy. This material and discursive structure, in which technoscientific subjects act as crucial political agents in policy-making, rather than operating as an instrument of extension of the alternatives of policies, (becoming the commercial-technoscientific development the end of politics) seems to reduce the democratic processes of the formation of public choices. Furthermore the scientification of politics and policy tends to obscure the wider processes of co-production of normative knowledge which emerge, rather, by the relationships between science and politics, acting within the public sphere, and in a particular kind of policy which is, on an international and national level, dominated by the interests and rules of the global market. In this study, the attention is particularly on these invisibilised forms of normative knowledge and power which tend to maintain the social order in the general context of crisis, transience, and changes that characterise this phase of modernity.

In the first chapter I introduce the theoretical framework of this research, the background assumptions and the methodology through which I develop the empirical case study. The reconstruction of the theoretical framework is divided into three parts. First, I consider the debate about the sociological definitions of *risk* and *knowledge* societies as interpretative models of current late-modern societies, and particularly those approaches in which the emphasis is on the elements of crisis – environmental, political, social, institutional and economic crisis – and risk as both the common social scenario and imaginary of contemporary capitalist democracies, and as the main discursive and practise mechanism of power reproduction. In this reconstruction I intend to summarise the current framework, in sociological literature and in the public debate, through which this phase of modernity seems to be socially imagined as: an 'age' of precariousness, transition, crisis, in which increasing technoscientific innovation and knowledge are required ambivalently for the development of humanity and in order to overcome both the current crisis and the risks which emerge in the emergency and in the necessity of structural social changes and in turn from technoscientific innovations.

Framing the sociological debate about the current social changes which challenge and define the crisis of the modern structures and systems of power and the authorities of states and supranational entities, the second theoretical focus is on the literature about the relationships between technoscience, politics and society, and more specifically about the relationships between technoscientific knowledge and political power, and particularly those theoretical approaches which elaborate models of the operation and dynamics of co-production of normative knowledge involved in the construction and development of public agendas and within the different fields of policies.

The third theoretical focus is on the debate about the implications for the contemporary democratic systems of power which emerge through the framing of political issues as fields of emergency, necessity and risk policies and through exceptional condition in order to make public decisions. More precisely, I considered those theoretical approaches which take into account, on the one hand,

the state of exception as a paradigm of government, particularly in those situations that are defined as emergency and necessity, and connecting these last to the factual and discursive structures of risk policies, and to the possibility to observe this field of scientific governance as part of the dynamics of affirmation of forms of scientific despotism and states of suspension of the rule of law in contemporary democracies.

Relating to this idea, I explore those studies that take into account the constitutional consequences of the domain of technoscience in politics, and the implications of the processes of reframing the notions of populations, rights, citizenships, and, in general, of living beings through the super-ordination of technoscientific discourses and activities in politics. The idea of scientific despotism is the notion which connects the paradigm of the state of exception, by extension, to the processes of the scientification of policy and politics, particularly in the field of risk and emergency regulation. The processes of scientification, which obscure and invisibilise the forms of power that emerge, rather, through the co-production's dynamics, are interpreted as the constitutive course of legitimation of political actions in states of exception, emergency, risk and crisis, and they express the kind of form that the suspension of the normal democratic rule of law, the state of exception, takes, particularly in these fields of policies.

Scientific despotism does not mean just the scientification of the discourses and practices of politics and policies, framing and setting risk issues predominantly as a matter of technoscientific assessment and management. Rather, the more invisible despotic dimension is in the scientist ideology that pervades the dynamics of reframing the scopes of policy linked to the regulation of life science, and more generally the reproduction of political and social life. Scientism coincides with the idea that technoscience is the exclusive or the predominant form of rational knowledge which can ordinates social meanings, power means and political relationships. Connecting the approach of co-production of scientific knowledge and political-economic power to this perspective and to the idea of the state of exception as the paradigm of government of risk issues, the different

levels of scientific despotism, within diverse national political cultures, can be seen as those forms of scientism through which the same co-production processes – and the same social, political, normative dimensions of technoscience, particularly when it acts, in policy, as a political agent – are neglected, ignored and invisibilised.

In the light of these three focuses, and with particular regard to the first one, in the first part I take into account the theoretical conceptualisation of risk society of Ulrich Beck (1986), with a more detailed attention on his idea of reflexive modernisation and, through it, on the emphasis of media, political and scientific interest gravitating around the social production of risk. Risk becomes the central notion to describe the set of social effects of the dynamics of modernisation and its economic and technological processes, and through this centrality of risk technoscience and technoscientific knowledge are more and more placed in a very crucial position within the structure of power, in framing, assessing and managing risk issues. It is a society that, as it pays more and more attention to the future, under the blows of a wearing precariousness of the present, the production and distribution of power, the forms of legitimation and maintenance of (political and economic) orders are strictly connected with the centrality acquired by the discourses and the practices linked to the assessment of risk and by the activity of the prediction of the inevitable consequences and implications of modernisation, in the general governance of uncertainty in the crisis of modernity.

In the second theoretical section, the idiom of co-production of Sheila Jasanoff (2004) is reconstructed in order to compose the framework of the relationships between political, scientific and civic cultures in which I investigate the GMOs case study. By the use of the co-production model, in this dissertation, I aim to develop the idea that through this perspective it is possible to extend, first of all, the vocabulary of the social sciences, on the connection between power, science and public culture in current late-modern societies. The focus of the idiom of the co-production of normative knowledge is on the non-linear and con-fused processes through which the production of

science and technology "*becomes entangled with social norms and [the] hierarchy*" (Jasanoff 2004; p. 2) of power by which the social order is reproduced, highly social relevant public decisions are taken, and populations are governed. As Jasanoff argues, in the lack of a terminology, in the dominant analyses of economic, sociological and political science, which can explain the intricate and constitutive role of technoscientific discourses, models and actions in the reproduction of power in current risk and knowledge societies, and within the emerging and fertile field of science and technology study (STS): the idiom of co-production constitutes a perspective from which to look at the dynamics of the reproduction of knowledge-power, whilst trying to transcend any forms of social or technoscientific determinism that can bring the observation to emphasise, and simplify in a cause-effect relationship, the way in which the scientific and the social dimension are due to the effects which occur in both spheres of social action.

In the third theoretical section, I focus the attention on the paradigm of the state of exception of Giorgio Agamben (2004), in order to take into account how, in situations which are institutionally defined as crisis and/or emergency and constituted by the connotation of forms of (governmental and) social actions determined by a state of necessity, the 'normal' democratic course of policy and decision-making turns out to be suspended. On the basis of this perspective, I follow the paradigm of the state of exception with the aim of considering the constitutional implications of the current government of risk and emergency on the level of effective democracy of modern states, and exploring the processes of legitimation of those political decisions which are taken in such states of potential or actual crisis. I apply this idea of the state of emergency to the case of the regulation of GMOs in European knowledge societies, and particularly in the two national contexts of investigation, in Italy and Britain, and I try to extend the conceptualisation of Agamben on the state of exception to policies of risk. As in Agamben's interpretation, the exceptional suspension of the normal course of the democratic processes of the formulation of governmental decisions and policies seems to become the normal practice of government and governance in late capitalist societies, and I consider this interpretation of current processes of decision- and policy-making,

where emergency and necessity are the justifications on which the rule of law is suspended, very pertinent to the discursive and material structure of the regulation of risk issues in European knowledge societies.

In this extension of the paradigm of the state of exception, I connect the theoretical paradigm of Agamben to the analysis, by Robert Doubleday and Brian Wynne (in Jasanoff 2011), which focus is on the GMOs controversy in Britain, and particularly to their idea of scientific despotism in the current processes of reframing relationships between the state, science and citizens in contemporary knowledge and risk societies. Exploring the experience of public dissent and mistrust over scientific, commercial and state commitments to GM scientific research and agricultural innovation, the authors argue that these developments have to be interpreted as constitutional processes of reframing and reordering of public understandings "*of science and its object nature*," and, at the same time, as a more tacit and invisible reframing of the predominant forms of constitutional ordering of the agency and rights of citizens in relation to science and the state. In this perspective, in the correspondence between the idea of Wynne and Doubleday and the idiom of co-production of normative knowledge of Jasanoff, these developments (these emergent and incomplete reorderings) are a function of "*questions raised by new objects, techniques, and practices that embody genetic understandings of life, but whose legal and social meanings are far from clear at the moment when scientific work first conceives of them or brings them into being*." (Doubleday, Wynne, in Jasanoff 2011:28)

Therefore, the study of the reproduction of social orders is combined with the observation of the social production of technoscientific knowledge and biotechnology innovation, investigating what constitutional forms contemporary democracies take in this technoscientific disposition and increasing rationalised fields of public decision, and through the affirmation of the necessity of the management of emergencies, crises and risks of late modernity.

After this theoretical reconstruction, I summarized the methods of research, focusing on the explanation of the choice of the case study on the regulation of GMOs in Europe and the selection of the two national contexts of the comparison. In this methodological account, I described the tools of qualitative research through which I developed the field research. With regard to the section dedicated to the presentation of the case study and the dimensions of comparison, I highlighted the following elements: *a)* the high representative of the case of the GMOs regulation and dispute within the European context, recognized in the sociological literature and in STS debates, and particularly concerning the study of the dynamics of power in the normalization of risk and crisis in contemporary societies; *b*) the elements which constitute such representativeness, that are expressed through the connotation of biotechnology policy as a *i*) technoscientific risk controversy *ii*) that is characterised by a global diffusion and *iii*) as part of the processes of reflexive modernization of late modernity.

Concerning the reasons which explain the selection of the two national political cultures, this research is based on the comparative method for differences, and it founded on the study of the GMOs case in Italy and Britain. Therefore, as I address in the methodological part, the selection of the two countries is strongly related to the choice of the GMOs case study: the comparison for differences between Italy and Britain has been founded – particularly during the phase of the design of research – on the divergent positions and decisions that the two central governments have taken in the field of biotechnology policy, thus considering the opposition of the Italian government to GMOs and the promotion of biotechnology enterprise in Britain.

Following this account on the case study and the comparative method of analysis, I summarized the qualitative tools of the research, including the study of theoretical material and official documents, textual analyses of articles of newspapers and scientific journals, and the interpretation of the material which is emerged by the phase of fieldwork, conducted, in Italy and in UK, through a series of participated observations and about 60 semi-structured and informal interviews with

various categories of subjects resulted particularly involved in the development of the GMOs public controversies and policies in these two national contexts.

In the full Italian version of this thesis, after the description of the theoretical and methodological structure of research, in the second chapter, I developed a synthesis of the processes of international regulation of GMOs and, particularly within the EU, of the dynamics of normalization of biotechnology risk in European arenas. In this part, the analysis is aimed to describe, from a scientific, legal, political and social viewpoint, the developments of the last three decades (1990-2000-2010-12) in Europe in relation to the processes regulation, marketing and cultivation of GM products, thus particularly concerning the European agro-industrial circuits and systems. Reconstructing the recent history of GMOs both within the international context and in Europe, I took into account the developments through which, considering the evolution of the EU approach[8]

[8] The approach to biotechnology in Europe has been constructed on the basis of an 'original' contrast in market mainly with the US discipline. Nevertheless, the development of the GMOs regulation in Europe and in America has taken joint trajectories and several points of conjunction, especially if we consider the more recent position of the EU in this field of policy. The EU first has been involved in biotechnology regulation in the mid 1980s. In this phase, the Directorate General on the Environment, Consumer Protection, and Nuclear Safety (DG XI) considered biotechnology with certain skepticism (even more than the other DGs, particularly Science, Research, and Development, DG XII). In 1985, the EU's Biotechnology Steering Committee established the *Biotechnology Regulations Interservice Committee* (BRIC), a technical committee composed of representatives from DGs III, V, VI, XI, and XII, in order to constitute the main forum for developing biotechnology regulations within the European Commission. The DG XI became the "*chef de file*" or responsible authority, within BRIC. At this stage, in drafting a directive on regulating of the deliberate release of GMOs into the environment, it has been chosen "a process" rather than "product-oriented approach" (Lynch, Vogel, Council on Foreign Relations, 2001). Considering both the conflicting situation on an international level and the divergent positions within the European context, the more cautious regulatory approach proposed in Europe produced, once that the draft directive was submitted to the Council of Ministers, in 1990 the Directive 90/220/EEC on the Deliberate Release of Genetically Modified Organisms, which has been based on the precautionary principle. Through this juridical instrument it has been decided that "*applicants who wished to conduct field tests of GMOs were required to apply and submit an environmental risk assessment to the 'competent authority' of the country where testing will occur. It further required another application to each Member State to market genetically-modified products and granted each Member States the right to object to such marketing within their borders. Under Article 16, any EU Member States may 'provisionally restrict or prohibit' the use of sale of a product if it has 'justifiable' reason that an approved product poses a 'risk to human health or the environment'*"(Lynch, Vogel, Council on Foreign Relations, 2001). These double pressures – the applications for internal marketing of GMOs and the increasing US production and export of genetically-modified crops – produce institutional and social demands for the labeling of GM foods sold within the EU. In December 1996, the European Parliament and the Council of Ministers provisionally agreed to a compromise whereby novel foods would be labeled if there was any change in their "characteristic or food property" compared to 'traditional' food, but mixtures of genetically-modified and conventional foods would not be required to be separated. Through these steps, the Novel Food Regulation, which came into effect on May 15, 1997, did not cover foods that had already been approved, namely genetically-modified soybeans and corn. Nevertheless, a second Directive, adopted on September 26, required the labeling of genetically-engineered soybeans and corn as "genetically modified" a more demanding label than the earlier "may contain" labeling requirement of the Novel Foods Regulation. In May 1998 a qualified majority of the Council of Ministers adopted a proposal on the mandatory labeling of food shown by DNA and protein testing to contain genetically-modified corn and soybeans. After years of debate about the

and the precautionary principle, European legislation has been constructed, starting from a position of banning, within its borders, of the commercialisation of GMOs, to a political and economic trajectory of support and promotion of agro-biotechnology products in European markets. In this shift, I considered the several and diverse conflicts[9] which emerge between the EU and international institutions and in the relationships particularly with some European countries, in the exigency of a policy of compromise among international economic and commercial interests and national sovereignty, which have characterised the last three decades of the GMOs normalisation in Europe. In view of these elements of exploration, this reflection on the European framework of regulation is

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content of the label and the threshold of genetically-modified material which would require labeling, in January 2000, the EU placed a relatively strict standard, requiring the labeling of food at least 1% of which was genetically modified.

[9] The GMOs regulation in Europe is representative of a series of controversial and conflicting cases which characterize the history of biotechnology policy in the EU. One of these conflicting situations is traceable through the case of a British company that in 1994 has developed the commercialization of a genetically-modified canola (oilseed rape): in that phase, this case can be read as one of the first tests of the EU's approach to regulation. The British Advisory Committee on Releases to the Environment (ACRE) – established as part of the UK's transposition of the Deliberate Release Directive into domestic law – recommended UK approval of the canola in April, and in May, the UK Department of the Environment proposed EU-wide approval. However, Denmark, Austria and Norway opposed EU-wide marketing, basing their opposition on domestically-conducted scientific research which showed issues of contamination of local natural crops of canola in their own countries. While the application was supported by a qualified-majority in February 1995, because of continuing controversies within the EU over labeling of GMOs, approval of canola was delayed until mid-1997, when the company agreed to voluntarily label its product as GM. Within the EU, another controversy exploded over the European Commission's December 1996 decision to allow marketing of Swiss GM corn. Environmental protection and consumer groups challenged the Commission's decision as did a number of Member States in several national and supranational arenas. In April 1997, the European Parliament challenged the Commission's decision to permit the sale of the corn, and called on the Commission to suspend its decision until further scientific investigation could be completed. This centrality of the scientific ground in the dynamics of legitimation of the biotechnology policy is the aspect which places closer the European approach to GMOs to the American dynamics of regulation. Nevertheless, although permission to market the corn was eventually granted, the controversy between the EU institutions has predisposed the condition for a major revision of EU policy concerning GM foods. On the other hand, in this situation, the trade implications of the divergences between the EU and US approaches to biotechnology became more crucial in 1996, when the US exported its first crop of GM soybeans and corn to the EU. The 1996 soybean crop in the US was the first to contain GMOs, which consisted of approximately two percent of the total harvest. Even if the EU had approved the import of GM soybeans, the trade association *EuroCommerce*, along with European food retailers, demanded that the US separate GMOs from conventional soybeans. In the history of these controversial and conflicting cases, a very significant role is played by the multination company Uniliver. In the full Italian version of this study, I explored the attitudes, strategies, actions and discourses of this economic subjects particularly in relation to the British case, and I summaries the 'public' role of this private company (Doubleday, Wynne, 2011) in the GMOs regulation in the following part of this synthesis. Nevertheless, considering the elements presented so far, it may be useful to say that the German division of the Unilever company canceled its order for 650,000 metric tons of soybeans unless they could be guaranteed to contain none of GMOs. GM corn, which was approved for sale by the EU in December 1996, was exported to Europe from the US in November, although the US denied that its initial shipments of corn contained GM varieties. The entering of GM soy and corn from the United States at the end of 1996 and the beginning of 1997 attracted media attention and significantly increased and contribute to diffuse public awareness and concern throughout Europe. Following these evolutions and different levels of conflicts, the result was a marked change in risk assessments by regulatory authorities in a number of Member States. Directive 90/220 had not required market stage precautions, on the assumption that regulatory oversight and precaution would not longer be necessary once GM products had been approved as safe for commercial release. Nevertheless, in response to public protests, particularly France and Britain re-interpreted the Directive's scope in order to include the effects of agricultural practices in their risk assessment, thus extending and further strengthening the application of the precautionary principle to this technology.

primarily constituted on the basis of the analysis of numerous juridical, political and scientific sources and documents, mainly, produced by the Community institutions, European agencies and commissions and all those scientific authorities directly involved in the formulation of biotechnology policy in Europe.

Furthermore, In order to give an account of the most recent developments in the field of the GMOs regulation and, more generally, in risk issues in the European knowledge society, I examined the latest legislative proposals[10], in 2011-2012, as an unsuccessful attempt to find, in European arenas, a conciliation between EU and states sovereignty and these two levels of decision and policy making relating to the regulation of GM cultivation. On the one hand, the exploration is on the need of the European authorities and institutions to maintaining a centralized regime of technoscientific assessment and management of GMOs, particularly concerning the procedures, dispositives and the system of authorization of GM seeds, crops and products in Europe, trying to ensure a certain level of uniformity and unity of these procedures at the European level, basing the exigency of conformity as a condition and a sign of the affirmation of 'sound science' and thus 'good policies' within the European knowledge society. On the other hand, I considered the claim of sovereignty of, particularly, some member states and of their freedom and agency of prohibiting the cultivation and spread of GM within their national territories on the basis of grounds and orders of reasons other than those strictly relating to the scientific assessment of the GMOs risks on the human health and on the environment, considering how this matter of regulation is predominantly based on the European technical system of authorization and control, since 2002 under the control of the European Food Security Authority (EFSA).

[10] European Commission, Brussels, 13.7.2010 COM(2010) 375 final 2010/0208 (COD), *Proposal for a Regulation of the European Parliament and of the Council amending Directive 2001/18/EC as regards to the possibility for the Member States to restrict or prohibit the cultivation of GMOs in their territory* {COM(2010) 380 final}; {C(2010) 4822 final} In order to deepen the last development in GMOs European regulation in the current process of reframing the normalization of this field of innovation and harmonizing the normative about the commercialization and particularly the cultivation of GMOs within national territories: the Report 20th April 2011 On the proposal for a regulation of the European Parliament and of the Council amending Directive 2001/18/EC as regards the possibility for the Member States to restrict or prohibit the cultivation of GMOs in their territory (COM(2010)0375 – C7-0178/2010 – 2010/0208(COD)) Committee on the Environment, Public Health and Food Safety; (Rapporteur: Corinne Lepage). http://www.europarl.europa.eu/sides/getDoc.do?type=REPORT&reference=A7-2011-0170&language=EN

The European proposal and the more general attempts of reform of the last years have found a favorable vote in Parliament, in the summer of 2011, but they have been stopped in March 2012 by the EU Council[11] where it has been expresses that currently there is not an enough acceptable level of political agreements between the European system of the GMOs regulation and the several national and local dimensions of biotechnology applications, particularly concerning GM cultivation. In fact, on the 6 June 2012 The Council concluded[12] (10883/1/12) that "*no political agreement on GM cultivation can be reached at this stage*", curbing for now the reform proposals and making aground the possibility of formulating a normative text of compromise between the different principles that govern the relations between states and the EU, and between states, EU and local authorities. This means that it has not been given member states the agency to ban GMOs on the basis of reasons other than risk management and assessment. In fact, economic reasons, particular approaches of environmental protection in specific local areas of national territories, and environmental reasons, which are not included or differently treated in the assessment proceedings the European Union, do not constitute so far a legitimate and legal base for banning GMOs, rather these scopes of policy are connected to the centralized system of authorization granted by the Community.

This part of research about, particularly, these more recent juridical, political and economic developments of the European GMOs regulation is included in this dissertation just through a brief description of the main contents and elements which I have more exhaustively summarized in the full Italian version of this work.

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[11]Council of The European Union, 3152nd Council meeting Environment Brussels, 9 March 2012

[12] Council of the European Union, Brussels, 6 June 2012; 10883/1/12 Rev 1 Limite EU V 461 AGRILEG 82 AGRI 384 MI 406 DE_LEG 59 CODEC 1553: "It was not possible for the Presidency to reach a political agreement at the 'Environment' Council Meeting on 9 March 2012 as a blocking minority of delegations opposed to the said compromise proposal. DE, FR, UK and BE as they found the proposal in conflict with the single market, concerns on the compatibility with WTO, renationalisation and implementation of the 2008 Council Conclusions. SK was not able support the proposal and ES announced at the March Council meeting that they were not able to support the compromise proposal in March but would be able to support the proposal at the June Council. Ireland expressed certain reservations with the Presidency proposals, suggesting that the number of unresolved issues required further technical refinement. (…) Following the outcome of the "Environment" Council on 9 March 2012, the Presidency undertook to consider options for a political agreement in the future."

Likewise, in this dissertation I just present an outlines of the third and fourth chapters about respectively the reconstruction of the GMOs policy and public debate in Britain (Chapter Three in the full version) and in Italy (Chapter four). More particularly in the parts of the analysis of these two national contexts, I take into account, on the one hand, the contents of the British GMOs case study on which I developed then the comparison with Italy. First of all, in the introductive parts, I summarized the political, cultural and institutional framework within which the GMOs dispute takes place. This contextualization results to be necessary not only in order to describe the national – cultural, political, scientific and social – background within which the GMOs controversy emerges, with increasing public relevance, in the mid-nineties of the last century; but also because the general and peculiar events of food crisis and public mistrust toward scientific and political institutions characterize in a primary way the development of the GMOs public disputes and policy in UK. In these terms, the analysis of the GMOs case study in Britain is introduced through the connection between the biotechnology policy to those several public and scientific crises that have characterized the relationships between science, politics and citizens in situations of risk assessment and management: particularly, the case of the mad cow disease in 1996 and other environmental and food crises represent the constitutive framework in which public debate about GMOs has been developed in UK. Thus, considering these critical and risk events, the focus is on the relationships between science, politics and citizenship in the development of those risk controversies that seem to undermine the legitimacy of power institutions and authorities within the public space.

From this perspective, I analyzed the development of the GMOs controversy and biotechnology network through the reconstruction of public discourses and actions of different social actors: institutional, political, scientific, economic collective and individual subjects, Non Governmental Organizations (NGOs), farmers and industrial representatives relating to, particularly, the agro-industrial sector of biotechnology development. The reconstruction of the network of stakeholders, in UK, is mainly realized on the basis of a textual analysis of a series of newspapers' articles where the topic of GMOs has been treated (about 1500 articles, for both the British and Italian case):

connecting the different contents, perspectives, discourses and arguments which have been developed by the several social actors involved in the GMOs controversy, I designed jointly the network of the themes/positions (against or in favour of GMOs) and subjects. This reconstruction is also founded on the empirical material which is emerged by the fieldwork, particularly through the several semi-structured and informal interviews (about 30 for the British case) which I developed with a series of social actors relevantly involved in the processes of definition of GMOs policy and in public and media debates. Once reframed the British network of the main subjects, themes and different positions, I reconstruct the development of the GMOs controversy and policy retracing the different facts, events, actions and decisions which have produced the discursive and material structure of the GMOs regulation in Britain. After that, in order to explore deeper the relationships between science, politics, expertise, particularly in the GMOs policy-making, and citizens, I take into account the dimension of social conflict, public mistrust and the general opposition and resistance to GMOs, the ways in which this public position has been faced by governmental and scientific institutions, NGO and economic subjects, and particularly focusing on the forms and policies of public communication and engagement with science which have been developed by the British government and scientific authorities in the social resistances and public conflicts.

In this dissertation these different trajectories and elements of analysis, through which the British case is reconstructed, are reproduced as main points which support and result to be essential in order to present the comparison between Italy and Britain: the focus is on, on the one hand, the processes of scientification and de-politicisation of the GMOs public debates and policy, through the definition, by the British state and scientific authorities, of *science-based policy*, and on the affirmation of the favorable position of the British government in support to the GMOs enterprise predominantly on the basis of this scientific disposition of policy and politics. On the other hand, and considering this general support of the British authorities in the development of biotechnology innovation, on the contrary, the general public skepticism and distrust of the risk of the actual benefits that can result from a choice in favor of GMOs and the idea of itself as a “GM Nation”.

Similarly, in the Italian version of this dissertation I developed the analysis on the biotechnology regulation in Italy. In the full research this chapter reproduces the structure of the exploration of the British case, while considering the different and individual paths and developments of the GMOs policy in these two European countries. From a comparative perspective, I reconstructed the legal and political relations between scientific and political authorities within the Italian borders, focusing particularly the attention on the different form of state in Italy, with specific regard to the dynamics of attribution of power and competences between the central state and the local authorities. The framework through which I introduce the national cultural context, where the debates on GMOs take place, focuses on the singularities of the Italian food culture that characterized this territory for the specificity of regional and local different foods and dishes which contribute to the construction of the national and local cultural identities. In short, I underlined how the deep and traditional importance attributed to the element of high quality and controlled-origin of Italian food products, in the national imaginary and at the international level, is one of the key element selected in order to contextualize the singularities of the Italian national cultural within which the GMOs policy and the public debates emerge in Italy. In the central sections of the chapter, as well as for the British case, I reconstructed the network of actors and themes-arguments that compose the web of the relationships and issues through which the GMOs debates have been developed in Italy. Once delineated the network of subjects and argumentations, I have summarized the political and juridical processes that constitute the production of the GMOs policy and the order of justifications of the Italian Government's decision on biotechnology research and development.

In this part I explored the reasons and the bases of justification on which the Italian government has taken its position against GMOs, and through what types of relationships between the scientific and political field this governmental decision has been developed. On the basis of this Italian trajectory of policy, the focus of this part is particularly on the conflicting relationships between science and politics which has strongly characterized the GMOs controversy in Italy. Through the analysis of these conflicting relationships between Italian scientific subjects and institutions and governmental

authorities, I considered how the firsts have promoted and engaged a public and media campaign against what they defined as the obscurantist GMOs policies of the Italian government: the zero tolerance of the Italian politicians to the GMOs has been interpreted, according to the most of the Italian scientific societies, as a position of ignorance and anti-science because of the non consideration of the reasons of scientists and for the lack of scientific autonomy and independency in the process of definition and management of the GMOs policy. The scientific opposition to the biotech attitude of the Italian government is thus based on the fact that the Italian government, particularly in the last decade, has expressed a trajectory of zero tolerance to GM products, especially in agriculture, but blocking, from 2000-2001, most of the funds for biotech research.

In the development of this dispute between science and politics in Italy I observed that the GMOs case has been developed as a sort of spark that set off a series of pre-existing conflicts and opposing views among members of the Italian scientific community and the political authorities. In this sense, as a sign of the singularities and situatedness of the production of scientific knowledge, research and technological innovation, the GMOs controversy in Italy comes more strongly out as a problem of freedom of scientific research within the Italian state territory, and as a question of 'politicization' of science. In this conflict the main issue which has been expressed by most of the scientific subjects has been the non independency of science from the political irrationality, obscurantism and instrumentalisation. As I observed in the Italian version of this research, within the public debates and in the more salient phase of the conflict between science and politics in Italy, the scientific lobby in favour of the development of biotech sector (re)started its opposition to Italian government associating the GMOs case to a series of previous 'scientific' policies in which, as it happened in the so-called Di Bella case, the Italian scientific community considered the Italian governmental attitude to scientific decisions completely anti-scientific and rather predominantly oriented on the basis of electoral and instrumental commitments of Italian politicians.

Furthermore in the third part of the chapter, I developed the analysis on the regulation of GMOs considering the relationship between the national framework and local authorities, particularly with regard to two cases: on the one hand, I explored the reaction of the Italian government to a case of alleged GM contamination, in 2003 in Piemonte, a region of northern Italy, deriving from some non GM corn seeds, imported from America, that resulted to contain traces of GMOs. Considering the Italian approach of zero tolerance to GMOs, in this case the central government applied the model of the state of exception and emergency, using the typical instruments of the suspension of the rule of law in order to wage a "war" against the "infected" and "outlaws" contaminated maize, acting through emergency decrees and predisposing the destruction of all the batch of corn.

The second regional case which I used to explore the different dimensions of this comparison, and particularly the relationships between science, politics and citizens, and the relations between the central Italian state, the local territories and the EU in the GMOs regulation, consists in the reconstruction of the singular controversy, started in about 2010 in Friuli Venezia Giulia, another northern Italian region, and particularly in the province of Pordenone. It has been characterized by the dispute between a group of farmers which is in favour of the cultivation of GM crops (specifically a kind of GM corn) and intentioned to plant GM seeds in their fields, while going against the Italian ban to GM cultivation, but following, on the basis of their argumentations, the European system of regulation of authorizations of GM products. In fact, the kind of corn that these Italian farmers decided to plant is already authorized and included in the EU official catalogs which contain the list of GM legal product in Europe.

In the first case, the exploration is particularly aimed to highlight the development of the Italian policy as an emergency and a matter that is carried out through one of the most common normative tools which are expressed in the affirmation of the state of necessity: the emergency decrees. This instrument is typical of those situations of management of political, environmental, economic, and food crises, it is a governmental act having the force of law, and that rules, especially in the

regulatory processes of Italian biotech policy, suspending the normal parliamentary course of legislative power, and rather conferring exceptional normative power to governmental authorities.

Through the exploration of the second regional and local case, I have tried to highlight several crucial dimensions of this analysis: the contradictions and conflicts that arise between the Italian and the European Union, and those between juridical authorities – particularly the institutions of constitutional control of the normative acts of the Italian government – and political power; furthermore those conflicts between the central state and local entities, and within these territories, the relationships between 'private' citizens, economic subjects, NGOs and the policy of the central state. In the exploration of these conflicts and social frictions, the case of these Italian farmers pro-GMOs shows how there are multilevel planes of law, legality, legitimacy and disobedience: in effect, according to the Italian law which bans GMOs, the pro-biotech farmers have been considered 'disobedient', but authorized by the European legislation; and, on the other hand, the activists and members of NGOs against the spread of GMOs on the Italian territory which acted destroying the GM cultivation planted by these farmers, have been seen ambivalently as disobedient, in violation of the private property, and, at the same time, as social actors which, acting in this way, restored the state of legality expressed by the Italian prohibition. Moreover, particularly through this second case, I intended to underline the formation of a series of alliances and relations of close collaboration and support that have emerged between the various scientific networks arose in order to defense the biotechnology enterprise and research, and the group of economic subjects and farmers pro-GMOs. The exploration of all these dynamics and dimensions together has the attempt to cover both the peculiarities of the Italian case, but also the common affirmation of states of emergency and necessity, sustained through the discursive and material dispositives of scientification of policy, which work obscuring the coproduction processes.

After the exploration of these two national case studies, I developed the comparative analysis which is summarized in this English version through the reconnection of all the several dimensions of

research, in order to underline the differences and similarities that can emerge from the empirical and theoretical case of the GMOs regulation in Italy and Britain, within the common framework of normalization of EU biotechnology risk. In the light of the paths of research developed in the analysis on the two national cases, the dimensions taken into account in the comparison are summarized by the following points-issues:

a) the position of the Italian and British central government against on in favour, particularly, to the cultivation and commercialization of GMOs on their national territories;

b) the relational forms (conflicting or consensual) between the scientific and the political national authorities of the GMOs regulation;

c) the relationships between citizens and governmental and scientific authorities;

d) the relationships between the central states and the EU;

e) the relationships between the central states and local entities.

These dimensions deal the comparative analysis of the analogies and differences between Italy and Britain within the European framework. Firstly I emphasized how the difference between these two countries expressed through the opposite positions and decisions of these two European countries is constructed in both the cases on the same basis of legitimation, that is on the ideology of the domain of scientific knowledge in policy and politics. The Italian central government has justified its position of zero tolerance to GMOs on the basis of the insufficient scientific evidences on biotech risk that can support a choice in favour of GM products; Britain has expressed a strong interest and commitment in the development of biotechnology enterprise predominantly founding and justifying its policy and decision on the basis of science and scientific evidences. I observed how this common approach of scientification of the ground of legitimacy of the GMOs policy – considering the subjectivity which is expressed through the affirmation of the concepts of necessity and emergency on which the same scientification is institutionally presented as essential – has produced in Italy and

Britain two opposite political results, economic trajectories and diverse governmental attitude to biotech, particularly in the relationships between scientific and political social actors, and between public authorities and citizens.

In the light of these considerations, I presented the dimensions of comparison constructing two tables and describing how the elements on which I focused permit to observe both the analogies and differences between the British and Italian case. The main trajectories of analysis which I developed are:

a) the level and dimension relating to the legitimacy on which public decisions have been founded in both countries: through the analysis about the GMOs controversy in Italy and Britain it is possible to observe how the common dynamics of scientification of policies and politics, and the common affirmation of (supranational, transversal and) ambivalent form of states of emergency and necessity can produce singular and divergent results, but essentially claiming to justify and legitimate the GMOs policy on the basis of science. Through this focus it is possible to underline how this paradigm of government works within different national and cultural cultures, in the diverse relationships between science, politics and citizens, with the general and common result of obscuring the intricate coproduced normative knowledge, through which the policy is reproduced, behind the definition of scientific assessment and management of biotechnology risk; but reproducing two different political decisions. I addressed this issue observing how the regime of the state of necessity and emergency – while being affirmed by the belief in the supremacy of scientific objectivity – is particularly performed through the character of subjectivity, and it seems to express a form of arbitrary and non-democratic power. The idea of scientific despotism represents the form of suspension of democracy affirmed through the regime of the state of necessity and emergency that governs in the regulation of the GMOs in the European framework, producing divergent trajectories of policy and being affirmed in diverse ways in Italy and Britain.

b) Concerning more precisely the relationships between science and politics, while considering this supranational regime of scientific despotism which is involved and characterizes in different ways the Italian and British processes of the GMOs regulation, in the comparison between Italy and Britain I highlight how this paradigm of government is expressed through very different connections, alliances and conflicts between scientific and political authorities. In fact, I considered how even in Italy, where the GMOs controversy is mainly constructed on the basis of the conflict between scientific subjects, institutions and societies and political and governmental authorities, the form of scientific despotism is expressed by a general and latent relationship of reciprocity in the reproduction of scientific and political power.

In other words, I firstly presented the differences in the relationships between the Italian and British political and scientific authorities, and I underlined how the GMOs controversy is developed in Italy through the conflict between science and politics, and rather in Britain it is possible to observe an explicit consensual relationship between the main scientific authorities and societies and the central government in the GMOs issues. Nevertheless, considering this difference, and connecting it with the previous dimension of analysis, both the policies and decisions, in Italy and Britain, have been legitimated assuming the sufficient or insufficient level of scientific evidences on the biotech risks. Thus, it results that both the governmental decisions are constructed reaffirming and reinforcing the linear model of science in policy, and empowering the idea of scientific domain, particularly, in risk controversies. This means that even through the conflicting relationships between science and politics in Italy, it is possible to look at the invisible process of construction of reciprocal legitimacy and authority between these spheres of power, while considering the situated and local differences in the dynamics of institutionalization of scientific authorities in singular national cultures, and the peculiar interactions between scientific and political subjects and structures with citizens and specific civic epistemologies.

c) Taking into account these different developments and trajectories of policies, in Italy and Britain the relationships between citizens and governmental and scientific authorities have been characterized, on the one hand, through very opposite relational web and structures. At the same time, In the description of this dimension I observed a series of analogies which explanations are connected to the arguments addressed so far in the previous points. In effects, In the UK the social resistance and public skepticism to GMOs is opposed to the position of promotion and support to biotechnology of both political and scientific authorities. By contrast, the zero tolerance to GMOs of the Italian central government converge with the general Italian public opinion which appears, as the wider European populations, against the spread, particularly, of the GMOs into environment and in the agro-industrial sector.

On the basis of this opposite relational web between public authorities and citizens, I considered it in the light of the European framework of the GMOs regulation, and I have taken into account the recent development of particular approaches of public participation to this kind of 'scientific' policies (public understanding of science and public engagement with science): I argued how one of the most important differences which I underlined consists in the development in Britain, in line with the European regime, of a series of sub-policies finalized to construct public consensus and trust around the GMOs issue; rather in Italy this kind of policy of public understanding of science and public engagement of science has not been implemented. Mainly through this dimension I first highlight how in Italy and Britain we have two divergent form of interactions between citizens, politics and science in the GMOs controversy, and I tried to understand and explain the reasons of the more conflicting situations in Britain, and by contrast the ways in which Italian public and political subjects express a consensual position each others, while scientific authorities takes the role of a political actor which tries to engage citizens in the GMOs debate in order to persuade them of the acceptability of the GMOs risks and of the significant benefits that can derive from the development of the biotechnology research and industry. Through the reproduction of this divergent structure of relationships between citizens and public (scientific and political) authorities, I

underlined how the different ways to respond to public skepticism and mistrust in Italy and Britain, producing the development in UK, and not in Italy, of the exigency to establish channels of communication between science and politics, are in any case structured in ways in which forms of public alienation from the main arenas of decision making are developed. This is because in both cases the GMOs policy is constructed on the basis of a scientification of the decisional processes, at least on a discursive plane, and on the affirmation of the paradigm of government of the state of necessity and emergency.

d) Concerning the confrontation with the European framework of the GMOs regulation, the relationships between Italy and the EU has been very conflicting, considering the opposition of Italy to GMOs and the normative evolution in favour of the development of biotech enterprise in Europe. Rather, in the GMOs case Britain and EU have reproduced a policy very close and similar: not only because the UK and the EU are supporting the affirmation of biotech regimes of innovations, but also because the strategies of public engagement with science and the construction of policies in order to regain public trust and consensus are conceived as essential emergency and necessity for the maintenance of social order. I underlined how the GMOs case can show different aspects of the 'usual' relationships between EU and member states: in fact, if we consider the historical Euro-skepticism of UK and, rather, the constitutive role of Italy in the processes of European integration, the biotechnology case reverses this trend for several aspects, placing Britain closer to the EU framework of regulation than Italy.

In the light of these elements, firstly, I considered the dimension of juridical conflict between Italy and EU, and I summarized how this dispute has been developed and how the juridical emergency acts of the Italian government against the production and commercialization of GMOs have been considered illegitimate and illegal by the European institutions and authorities. On the other hand, I highlighted how the development of the GMOs structure of policy in UK results to be in line with the normative evolution of the GMOs regulation in EU, and I tried to show how the European

approach to this kind of risk issues is constructed on the basis of the governmental approach to risk and food crises that have developed in the UK, in the explosion of the mad cow crisis which produced public concern and mistrust that have affected the whole of Europe.

e) Looking at the relationships between the central government and territorial entities, through the GMOs controversy, in Britain and Italy, I focused the attention on the fact that, as for the other dimensions of comparison introduced so far, even for this aspect there are several elements of differences and other in common between these two European countries. Mainly I considered how in Italy, while taking into account some controversial and conflicting episodes occurred within the boundaries of regional and provincial entities and with groups of 'private' citizens, the GMOs policy and public debate have been developed through a general and strong consensus between the all the Italian regions and the central state: in fact, in the last ten years all the 21 Italian regions have expressed a position against the affirmation of biotech agriculture on their local territories which is in line and in agreement with the policy of zero tolerance of the Italian central government. This agreement among all the Italian regions has been sustained and affirmed specifically in the lasts Permanent Conference of State-Region, which is the competent organism of state-region control, organization and coordination of different crucial area of policies, in the constitutional distribution of powers and competences between the central state and the local entities (regions, provinces, and municipalities). On the other hand, in the UK the GMOs controversy has been characterized through a contraposition of the trajectory of policy expressed by the central government and the administrations of the states which compose the territorial divisions in autonomous local entities of this country. Particularly the contraposition of the government of Wales and Scotland to the UK processes of management of the GMOs policy has represented the crucial element of the comparative analysis through this explorative dimension.

Furthermore, in this scope, I underlined how the general tendency of managing and reproducing the relationships between the central state and the local entities in these two countries is different in the

GMOs controversy. In Italy, particularly since 2004, specifically in relation to the formulation, organization and implementation of the planes of coexistence between traditional and GM crops, the central state has derogated its competence and authority to the Italian regions. This means that in Italy it is possible to speak about a tendency to the decentralization of the GMOs policy, at least, in the agro-industrial sector. By contrast, in Britain, considering the divergent positions between the central state and the governments of Wales and Scotland, the general GMOs debate has been developed in terms of a national choice; this can be visible in the construction, particularly in the 2003-2004, of a public debate and consultation in Britain expressed to the question, which has been asked by the British central government to the citizens on their position relating to the development of UK as "GM Nation". Through these elements, I addressed how in Britain has been affirmed a tendency to the centralization of the processes of decision making relating to the GMOs regulation.

Considering all these dimensions of comparison, and with particular regard to this last point, I stressed the fact that even this trend of centralization of the GMOs decision and policy making which characterizes the British context can be seen as an element of convergence between the UK and the European framework of regulation, and, by contrast, it is something which situated in a opposite position Italy in the GMOs governance in Europe.

After the presentations of these dimensions and contents of the comparative analysis, in the last section of this dissertation I summarized the conclusions of this study, focusing particularly on the representativeness of the GMOs case in the understanding of the relationships between (technoscientific) knowledge and power, in the reproduction of current authoritative structures, in the dynamics of legitimation of political and scientific authorities in their relationships with citizens. Through these directions, in the conclusions I tried to re-connect the paradigm of government of risk issues which I used to explain the GMOs case to the general dynamics of governance of current crises of this phase of modernity, in order to open this study to further research and other intellectual paths of development.

First part

Theoretical structure and methods of research

In this chapter I present the theoretical structure of this research, the case study and methods of analysis. The first three sections are dedicated to the main theoretical approaches on which I developed this study, formulated the hypotheses and supported the comparison on the regulation of GMOs in Italy and in Britain, and in relation to the European normative framework of assessment and management of biotechnology risk policy.

First, in this theoretical reconstruction of the GMOs controversy, I considered the paradigm of risk and I interpret it as that common and dominant socio-technical imaginary which describes current late-modern societies. As I introduced so far, I particularly focused on the conceptualization of *risk society* of Beck, trying to recompose the current globalizing public discourses about risk and how its rhetoric and normative mechanisms and dispositives work in current democracies. In this way through the paradigm of risk I looked at the dynamics of social change and of the maintenance and distribution of power, in the explosion of the implications and consequences of the processes of modernization, which are reproduces at the same time as challenges for the structures of power and the authorities of modern societies. I underlined how, in this general scenario of uncertainty, the processes of scientific prediction, assessment and management of risks acquire a notable centrality in the dynamics of policy and decision making, and in the broader reproduction of power, authorities and social order. Particularly, starting through Beck's account on the dimension of risk and uncertainty of current late-modern societies – but with the aim to extend this analysis to other authors which study power through the paradigm of risk and emergency – I more specifically considered his conceptualization of reflexive modernization and his analysis on the characteristics of the global and technoscientific risk of late modern societies.

After that, in the second theoretical paragraph, I focused on the idiom of co-production of normative knowledge of Jasanoff, in order to explore how, considering this imaginary of risk, the

processes of decision and policy making are developed through the inextricable relationships between technoscience, politics, juridical economic and social agents, which take place in different cultural contexts and public arenas in a situated manner. Through the approach of coproduction of normative knowledge, within the STS's debate, the aim is to highlight those social relationships between knowledge and power by which, through the reproduction, ordering and regulation of technoscientific knowledge and innovation, social orders readapt themselves in the changes and crises of modernity.

In these terms, through the idiom of co-production I intended to underlain also those characters of invisibility and those dynamics of invisibilisation and obscuration, particularly within the public debate, but also in some sociological analyses, of the same process of co-production of normative knowledge: particularly the radicalization of the modernist and neo-positivist linear model of science in politics, where in the technoscientific domain the legitimation of politics and policies occurs, within a dynamics of scientification of the field of policy and decision making, these processes tend to obscure the coproduction and the hybridization between political, scientific, juridical economic and social interconnections. Rather, through the obscuration of coproduction, deliberatively or not, by the scientification of politics and policies of risk, emergency and crisis, political decisions and actions are legitimated on the basis of the scientific authorities and their credibility, which is supposed to descend, in the radicalization of the processes of modernization, on the basis of the autonomy and independency of technoscientific structures, agencies, institutions and subjects from social, political, economic spectrum of 'interferences' which are, in any case, involved in late modern controversy. These 'physiological' contradictions, which are intrinsically included in the reproduction of social orders in knowledge societies, create social frictions and conflicts between social structures and agents.

Considering this conflicting dimensions, the idiom of co-production of normative knowledge, through its focus on the intricate relationships between technoscience and politics within the

different and situated public spheres of regulation, constitutes the perspective from which I intended to observe the interconnections between the fields of production of scientific knowledge and innovation and the processes of construction of governmental power within public arenas and, particularly, focusing on the dynamics of legitimation of public decision and policy making processes, through scientific discourses, within the different national and local contexts of the regulation of globalising risk controversies. With particular regard to risk issues, ultimately, the decisions and the policies emerge by the intersections between technoscience and politics, within the public sphere of the co-production, and through scientific subjects and institutions that act as political agents and, vice versa, political actors who pretend to act, scientifising the fields of policies, as neutral subjects which make public decisions on the basis of a *delegation* of their agency to the competence and expertise of technoscientific regulators. Nevertheless, as I aimed to argue in this dissertation, the process of co-production is obscured, deliberately or not, by the process of scientification of policy and politics. In the invisibility and not deliberateness of this kind of long-term and constitutional processes, the dynamics of scientification are dealt by the institutional exigency of legitimating of both scientific knowledge and the processes of formation of public decisions, which are supposed to be constituted on the basis of the independency and autonomy of technoscience from the political, economic and social disputes. In this mechanism, both governmental and scientific authorities, in the uncertainty of risk societies, have to regain the consensus and negotiate the authoritativeness of its evidences, facts and argumentations in public sphere.

According with these last points, in the third theoretical section I took into account the constitutional implications of the scientification – as that process behind which the dynamics of co-production of normative knowledge are obscured and invisibilised – of the policies and politics of risk. First, I focused on the constitutional effects of the scientification of policy on the democratic systems of power, and on the processes of public participation to political decision and policy making, through the paradigm of the state of exception by Agamben (2004). The author highlights

how, in the current unfolding of societies dominated by political, economic and social crisis, emergencies, and institutional declarations of states of necessity, the state of exception – working through the suspension of the rule of law and of the 'usual' democratic course of the operation of governments – represents the 'normal' mechanism and dispositive of power through which political decisions and policies are declared to be produced in the current phase of crisis of modernity. I applied this perspective of the state of exception to the risk controversies, thus considering the state of exception as the general paradigm of government of risk policies: the deep focus of Agamben on the conceptualization of *emergency* and *necessity* as the discursive and material basis on which, in the current phase of crisis of authorities' legitimacy, the state of exception is politically and institutionally justified and sustained, results very salient in order to frame the rhetoric, discourses and decisions of political and scientific authorities in the GMOs controversy. In fact, in the case of the regulation of biotechnology, within the European and, in different directions, in the various national contexts, framing the GMOs debate as a matter of scientific risk assessment and management, and in the constitutional restriction/suspension of democratic dynamics through this processes of scientification, the state of exception in this policy is diffusely sustained by ambivalent rhetorics which describe the field of GMOs innovation simultaneously as an emergency and a necessity. It is an emergency not only because of the (domain of the definition of policy of) risks, which are involved and embedded in the biotechnological applications; it is an emergency also because the biotech enterprise is claimed to be, in the last three decades in Europe and in the international economic, trade and political institutions, as an urgent and emerging field of research and development which will determine the competitive advantages and progresses for the nations that will promote them. GMOs issues are also regulated and normalised as an emergency because of the diffuse and continuous social disputes and controversial debates on the risks and the scepticism about the effective benefits of GMOs that arise in public opinion. In general, the constitutional framing of the emergency is set up through an implicit or explicit recognition, by governmental authorities and public of levels of scientific uncertainty, not-knowledge and ignorance about GMOs

risks and their set of implications – which put in crisis of legitimacy the political and scientific institutions. The state of emergency and necessity is thus affirmed on the basis of a model of risk containment and regulation highly scientifised, in which the decisions are supposed to be necessary constructed through the predominance of scientific evidences: this means that the legitimation of these political actions and decisions is made to derive from the scientific authorities and their independency from political, economic and social involvement. This linear model of scientification of policy produces the exclusion (or the sub-ordination) of any extra-technoscientific argument, position, perspective and element of discussion, that, rather, very often it is identified, by the scientific and/or governmental authorities, as 'irrational' just because different from the scientific order of discourse. In this sense social conflict and public resistance to GMOs become in the European regime of the state of emergency and necessity a risk, because they undermine the foundation of power reproducing social crisis, public mistrust and dynamics of delegitimisation of political and scientific authorities.

In the processes of the GMOs regulation, the state of exception appears as the justificatory dispositive of (even opposites, as it emerge from the comparison between Italy and Britain) governmental decisions and acts: this emergency mechanism of policy making and decision is expressed through the necessity of framing scientifically the biotech policy in order to assess and manage rationally the risks and contain the social conflicts; the reproduction of the dominant discourse of the GMOs enterprise as a necessity, a *conditio sine qua non*, for future human development and progress; and the necessity, which is affirmed by the precautionary principle, of maintaining a scientific structure of regulation, even after the decision has been made and a GM product has already been placed on the market, in order to monitor constantly the implications of the spread of GMOs in different environments, and with the effect of making the normal GMOs regulation as an issue that has to be face as an emergency.

The focus on the constitutional implications of the processes of scientification of policy and politics, that I tried to analyse through the paradigm of the state of exception, emergency and necessity deals this theoretical reconstruction toward a conceptualisation of the forms in which this politics of government is reproduced in the suspension and/or restriction of the democratic rule of law, particularly in risk policies. In this regard, I connected the paradigm of the state of exception to the conceptualisation of *scientism* and *scientific despotism* of Robert Doubleday and Brian Wynne (in Jasanoff 2011), particularly, in their analysis on the case of the GMOs controversy in Britain, and about the relationships between technoscience, governmental agents and institutions and public. Through an analysis particularly on the several developments in the UK experiences of public engagement with science, the authors describe how these changes and these emerging fields of policies are strictly connected to the current national and supranational processes of reframing the constitutional notions of citizens, citizenship, rights, politics, democratic systems and policy making dynamics. Considering the diffuse and pervasive situations of public dissent toward the positions and commitments of scientific, commercial and governmental subjects, in the field of GM scientific research and agricultural innovation, Doubleday and Wynne take into account these dynamics as part of a wider and deep processes of constitutional changes which imply, in the maintenance of the order, the reorganization and re-framing of public understanding of science and "its object 'nature'" (Doubleday, Wynne, in Jasanoff, 2011). Within this processes, through the ever more crucial normative and performative agency of technoscientific authorities within the public sphere of knowledge and risk societies, technoscience seems to act as a sort of arbitrator who heads the different 'matches' of policies and the various social conflicts and emergency by its 'exclusive' competence and expertise of making sense of the reality and operating defining and re-defining the differences and boundaries between culture and nature, between cultural and natural facts, between (cultural) opinions and judgments and (naturalised) scientific evidences; ultimately it is on these divisions that the structure of power and social orders are reproduced. The developments in these processes of reframing values, social expectations, through cultural processes of naturalization of

the scientific distinctions between nature and culture (Latour 1998), which take place in the regulation of issues like genetic engineering innovations, are strictly connected with the processes of suspicious/reduction of the democratic disposition of power. With particular regard, in this dissertation, to the context of the European knowledge society, scientific advice and authority are systematically placed at the centre and in a super-ordinate position in regulatory control and public debate, especially for those issues which are framed as a matter of risk assessment, and as fields of decision-making completely based on the idea of full scientific independence from policy commitments, interests and from political and social culture. In this deep and fundamental role of scientific advice in policy, increasingly from the Second World War, the shift, which is suggested by Doubleday and Wynne, consists from an ever more constitutional function of science as "an *informant* of public policy (its classical role)", to "a powerful *cultural* agent", and "as arbiter of *public meanings*" (Doubleday, Wynne, in Jasanoff, 2011).

Through a not necessary deliberateness and in a reciprocal reinforcement between policy legitimation and technoscience, they argue, this extension shift takes the form of *scientism*: it means that, as technoscience is socially conceived as the "institutionalized epistemic (and hermeneutic) authority" depositary of verifiable truths, and thus assuming the scientific role of authority in the reproduction of social *meaning*, definitions and attributes of values in public issues. In this process of scientification of the sphere of public policies, there is an obscuration and subordination, to scientific discourses, of all other dimensions, interests, commitments, questions which are not conceived as included in the frame of scientific management of policy. In these dynamics of obscuration and subordination of 'extra-scientific' dimensions, the alienation of public' and 'lay' citizens' reasons and rationality, by the scientification of policy, and the reduction of public meaning in inadequacies forms of knowledge (Wynne, 1987; 2006; Dobleday, Wynne, in Jasanoff 2011) is a strong sign of the form of scientific despotism, and of democratic legitimacy's crisis, representing also a reason of constitutional social friction in current late capitalist democracies.

Thus, through the connection between the perspective of Wynne and Doubleday and Agamben's paradigm of the state of exception, emergency, necessity by which risk policies are interpreted to be governed, I described these dynamics of government through the processes of scientification and as characterized by forms of *scientism* and scientific despotism, which have the implications of dynamics of public *alienation* from the public decisions, and by focusing on the "*deep contradictions between more despotic and more democratic models of state-science-citizen relations*" (Doubleday, Wynne, in Jasanoff, 2011) in the European knowledge society and in the different national and local contexts of regulation of risk through the case of GMOs controversy.

After the description of these main conceptual backgrounds, in the other sections of this first theoretical and methodological part, I synthesized the case study of this research which I firstly introduced and explored through this theoretical framework; and I described the methods and tools of analysis with which I developed this research. The main end of the methodological sections is to describe 'why' and 'how' the exploration of the GMOs case study, and the comparison between the Italian and Britain national context of regulation, have represented in this analysis the methodological approach through which I focused on the dynamics and processes introduced so far.

Risk and radicalisation of reflexive modernisation in the crisis of modernity

Even though – but with very particular salience[13]– the work projects of *risk society*, authored by Ulrich Beck, regarding risk issues in the current phase of modernity, was originally published in 1986, Beck's approach to the relationships between modernity, risk and hazards represents currently, with ever more deepness, one of the most meaningful and stimulating representations of the crisis of modernity, particularly considering its focus on the relationships between scientific knowledge, distribution of power and management of emergencies and disasters deriving from the processes of modernization.

In the decade in which Beck's book was published, the consequences of the modern model of capitalist societies on the environment and social structures started being ever more crucial, visibly ambivalent and conflicting in globalizing public debates: in his observation of the expansion of public discourses about the hazard and risk deriving by human, and particularly, techno-industrial-scientific activities, the focus of Beck is on the development of processes of reflexivity of late-modern societies, expressed by the explosion of the effects of capitalist dynamics of modernization[14]. In this dissertation, his reconstruction of the materialization of risk society, in the crisis of modernity, represents an interpretative window through which to look at the conflicting social processes of re-conceptualisation of the notion of progress and development in late-modern societies, and of their effects on the current relationships between social structures and agents.

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[13] As I described in the Italian full version of this research, the emergence of biotechnology arose in a period of public crisis, in dynamics of delegitimation and social conflicts in the relationships between scientific and governmental authorities and citizens, particularly for the explosion of the debates and controversies about risk correlating to the processes of modernisation. The discourses and events of public risks coming from the products of technoscientific products and processes, very often dramatically, have exploded in the last fifty years. In this phase of crisis, in the second half of the seventies of the last century, and when Beck's book, *risk society*, was first published, in 1986, in Europe and in different parts of the world the consequences of the processes of modernization started to appear mainly as negative effects on the environment and people; and public opinion around the world has been represented as skeptic and mistrustful about the scientific, political and economic management of particular kinds of risk - I shall say – 'by rationalisation': the tragic event of Chernobyl and, before, the disaster of Bhopal, in India, in 1984, and that of Seveso, in Italy, in 1976 are some of the dramatic examples which accompanying the publication of Beck's book.

[14] The concept of modernisation is expressed by Beck as "*surges of technological rationalization and changes in work and organization, but beyond that includes much more: the change in societal characteristics and normal biographies, changes in lifestyle and forms of love, change in the structures of power and influence, in the forms of political repression and participation, in views of reality and in the norms of knowledge. In social science's understanding of modernity, plough, the steam locornotive and the microchip are visible indicators of a much deeper process, which comprises and reshapes the entire social structure*" (Beck,1992:50).

The ambivalent role of technoscience, within the processes of reflexive modernisation[15], and in the reproduction of social reflection[16] over the paths and models of development and progress of modern capitalist society, appears, in Beck's reconstruction, at the centre of risk society. That particularly if we consider the constitutive scientific function of risk assessment and management in the proliferation of risky consequences of modernization, within the general scenario of uncertainty of late-modern society; and, at the same time, for the identification of technoscientific processes of development and innovation as the motor of the explosion of the risky effects of modernity. Thus, in order to frame the centrality of the debate about risk and hazard in the crisis of modernity, and with the end to highlight the forms of power relationships between technoscience, politics and

[15] As Beck suggests we are living on the "*volcano of civilization*", in the grip of the consequences of a shift from of the phase of 'simple' modernity to a phase of uncertainty, which for Beck, is the reflexive modernity. The main characteristic of this transitory moment, through the changes and development of industrial societies, is that late-modern societies are now faced not just with the problem of harnessing and controlling nature, for the benefit of humankind; but "*essentially with problems resulting from technoeconomic development itself*'". The meaning of reflexivity, in Beck's risk society, as well as in his work with Anthony Giddens and Scott Lash, is that modernity in itself becomes reflexive, 'a theme and a problem for itself'. (U. Beck, 'The Reinvention of Politics: Towards a Theory of Reflexive Modernization', p.8). This new modernity has to solve the human-constructed problems which emerge from the development of industrial society, it has to face how those risks produced as consequence of modernization are '*prevented, minimised, dramatised, or channelled*'(*Risk Society: Towards a New Modernity*, 1992, p. 19). The reflexivity, in Beck's view, has to be seen particularly on the dimension of the relationships between structures and agents of modern society which is developed in the shift of reflexive modernisation: in the explosion of the consequences and perverse effects of modernization's processes, and in the diffusion of risks, reflexivity means 'self-confrontation' with these dark aspects and effects of modernity, and, particularly, with the structural impossibility to predict, assess and manage the risk and uncertainty generate by the processes of development and progress of modernity. Reflexivity and reflexive modernization is that social dynamic and that historical phase in which the failure of the model of rational choice and supremacy of scientific rationality is ever more evident. As a processes of self-confrontation, reflexivity means, in this perspective, first of all the modern society's confrontation with the *unpredictability* of the consequences of social, natural and human developments and activities. Reflexivity as the unpredictability of the risk and perverse effects of modernisation represents the mirror image of modern society: this last has been built on the idea of full control on nature and human activities through the application of scientific and rational methods to the construction of social order; its mirror image shows, rather, the structural impossibility of this control, and particularly the impossibility of controlling the consequences which are reproduced by the modern's model of scientific and rational development and progress.

[16] There is, at the same time, a strong connection and an exigency of making a distinction, in Beck's approach, between the concept of (social) reflexivity and the development of particular forms of social reflection and public concern as the effect of the explosion of the consequences and risks of modernity. As Beck (1994b: 176–7) develops this distinction: "*the 'reflexivity' of modernity and modernization in my sense does not mean reflection on modernity, self-relatedness, the self-referentiality of modernity, nor does it mean the self-justification or self-criticism of modernity in the sense of classical sociology; rather (first of all), modernization undercuts modernization, unintended and unseen, and therefore also reflection-free, with the force of autonomized modernization…Reflexivity of modernity can lead to reflection on the self-dissolution and self-endangerment of industrial society, but it need not do so*". Thus, reflexivity does not necessary imply a kind of "hyper-Enlightenment" culture, where agents and institutions (just) reflect on modernity, but rather an unintended and invisible self-modification of society through the self-dissolution, first of all, of its main model of development and human progress. Reflexivity, in this account, is defined as much more by 'reflex' as it is by 'reflection'. In any case, as I tried to do in this research, "*it is possible to detect*", in Beck's recent sociology, "*a move towards seeing reflexive modernization as in most part propelled by blind social processes – a shift, crudely, from where risk society produces reflection which in turn produces reflexivity and critique, to one where risk society automatically produces reflexivity, and then – perhaps – reflection*"(Lash et al., 1996).

public which emerge in this social risk imaginary, I focused on the two main ideas which constitute the paradigm of *risk society* of Beck: the dynamics of reflexive modernization, and the centrality of risk as the 'visible' face and common paradigm of the invisible power processes which connect the several authorities involved in the reproduction of current states in the crisis of modernity.

Reflexive modernisation: an (optimistic) approach to the radicalisation of perverse effect of modernity

The core of the paradigm of risk society can be traced through the importance that Beck attributes to the ambivalence and paradoxicality of the processes of modernization, and to the centrality of science and knowledge in his observation, particularly, of the 'dark side' and the shadows of the modern processes of progress and development which seem to be reproduced through a cognitive, material and discursive domain of technoscience in the different processes of modernisation. This means that, in Beck's view, the consequences of modern scientific and industrial development – this last as the most visible symbol of modernity – are observable, rather, as a set of risks and hazards. These emerge, ever more diffusely, as the 'new' 'stigmata' that can symbolise the current phase of crisis of modern societies, through the proliferation of the debates about the risk and effects of the 'first' modernity on the present, and on the future of a 'second' – trapped in its consequences – modernity.

> Let us call the autonomous, undesired, and unseen, transition from industrial to risk society *reflexivity* (to differentiate it from and contrast it with *reflection*). Then reflexive modernisation means self-confrontation with the effects of risk society that cannot be dealt with and assimilated in the system of industrial society[17]. (Beck:1996, p. 6)

The current transition which Beck describes takes place as "*undesired, unseen and compulsively in the wake of the autonomised dynamism of modernization*"[18]. Thus, reflexive modernization, in this account, is a social constitutive self-confrontation, through the explosion of imaginary and materialization of risks, with the inability of modern (industrial) system and structures to face,

[17] U. Beck, 'The Reinvention of Politics: Towards a Theory of Reflexive Modernization', p. 6.
[18] 'The Reinvention of Politics: Towards a Theory of Reflexive Modernization', p. 5.

manage and control the processes of modernization, and their environmental, economic, political, social implications and perverse effects. Here the deepest core of the crisis of modernity. In fact, through Beck's lens on the character of reflexivity of contemporary late-modern societies, the current crisis of modernity can be shown in its less visible, but constitutive elements of friction, ambivalence and paradoxicality: *a)* those industrial, economic and technoscientific processes that are conceived, in the 'first' modernity, as dynamics of human development and progress, rather in reflexive modernization become, ambivalently, the motor of production of risks, uncertainty, environmental, economic, political and social crisis; *b)* in this shift, as industrial modernity and modern societies have been founded on the basis of the Enlightenment and modernist idea of supremacy of human rationality, and on the model of scientific control of nature and social order, through the manifestation of the mirror imagine of reflexive modernization – as a self-confrontation ultimately with the impossibility to face, prevent and manage risk and hazard – the modern idea of scientific and rational human progress and development results to be undermined at the foundations; *c)* the radicalization of reflexive modernization, as social self-confrontation with the impossibility to rationalize and deal scientifically the consequences of modernization, and then as a sign of the crisis of modern social systems and organisations, can open social controversial questions and public reflection about distribution of power, authorities' legitimacy and accountability, and critical and radicalizing developments in the relationships between social structures and agents.

Thus, the approach of reflexive modernization represents a theoretical perspective from which to try to observe the phenomena and processes of modern development and progress rejecting a 'simple' determinist idea of an hyper-rationalised and scientifised future, and from which it is possible to focus on the changes in the agency and power of individuals and collective subjects within the uncertainty of modern social structures and order, and within the processes of automatisation of late-modern systems. For Beck there is not linearity in the modern processes of development, and nor an exclusive determination by the twin forces of the market and technoscientific progress, as if

they are completely unchallenged and unchallengeable by the actions of citizens. Rather, the radicalization of reflexive modernization, as the radicalization of the automatisation, rationalization, and scientification of the system, being based on the idea of autonomy, independency and rationality of the individual and collective social agents that act in modern structures, can produce a sort of detachment between the structures and agents, and a self-modification both of their relationships and the same structures. In this shift, the development of an individual and collective consciousness on the limits and non neutrality or necessary positivity of scientific model of organizing societies can emerge through the radicalization of the alienation and automatisation of all the social (individual and collective) agents and structures, in the development of reflexive modernization, and, thus, through the 'revelation' of the impossibility to keep doing what modern societies have done so far, and of the impracticability of their models of development and progress, and of their consequences and perverse effects.

From this view, although considering the distinction which Beck describes between reflexive modernization and social reflection[19], the connection between the development of social reflexivity and reflection is very salient particularly in relation to the current risk controversies of this phase of modernity. In the GMOs case, the economictechnoscientific field of biotechnological innovation, as a development and radicalization of the processes of modernization, can be conceptualised as highly exposed to the reflexivity of this phase of modernity, and in this controversy the character of reflexivity is in the ambiguous form of recognition of the fact that there is a structural level of scientific ignorance, uncertainty and non-knowledge about the potential risks, damages and

[19] "*In view of these two stages and their sequence, the concept of 'reflexive modernization' may be introduced. This precisely does not mean reflection (as the adjective 'reflexive' seems to suggest), but above all self-confrontation. The transition from the industrial to the risk epoch of modernity occurs unintentionally, unseen, compulsively, in the course of a dynamic of modernization which has made itself autonomous, on the pattern of latent side-effects. One can almost say that the constellations of risk society are created because the self-evident truths of industrial society (the consensus on progress, the abstraction from ecological consequences and hazards) dominate the thinking and behaviour of human beings and institutions. Risk society is not an option which could be chosen or rejected in the course of political debate. It arises through the automatic operation of autonomous modernization processes which are blind and deaf to consequences and dangers. In total, and latently, these produce hazards which call into question – indeed abolish – the basis of industrial society*". Beck, U. (1994), *Ecological Enlightenment: Essays in the Politics of the Risk Society*. Atlantic Highlands, NJ: Humanities Press. In these terms, the line of demarcation between reflexive processes of modernization, and social reflection is mostly on the *unintentionally* of the first, and the major element of consciousness of the latter.

perverse effects on the environment and human beings that can be involved in GM processes and products. This is particularly about the public role of science in politics and policy. As Beck argues about reflexivity, in the GMOs controversy risk issue becomes the centre of normative discourses and of power; in this centre and in the predisposition of this culture domain of risk, scientific knowledge is placed cognitively as the problem, solution, instrument, end, and, in a sentence, as at the core of the dominant discourse of risk. This is not because of a deliberative action; this is the way through which in our world, with our behaviors, actions, practices, structures and norms, we are facing the uncertainty of social systems which we feel mostly to have created. Currently the unseen – paradoxically – narrative which is reflected through the GMOs case study seems to be: the economictechnoscientic system puts in place innovative products which can be dangerous and which risks cannot be fully controlled by the same structures which generate them.

This constitutive, (more or less) implicit element of reflexivity in GMOs controversy, as a sign of the radicalization of the processes of modernization, within international and national public spheres, is producing the development of forms of social reflection, friction, and dissent which put in crisis the authorities and structures of power of late-modern society. This is because, from the dispute and the reflexive controversy about GMOs, incontrovertibly, several constitutive elements of the crisis of modernity, as the inefficiency of modern system, based on the principle of scientific and rational efficiency, the un-democracy of current processes of decision and policy making, and the bias in the attribution of institutional accountability and responsibility, arise, challenging the maintenance of social order.

> …For modernization successfully to advance, these agents must release themselves from structural constraint and actively shape the modernization process. The historical Passage from tradition to modernity was supposed to uncover a social world free of choice, individualism and liberal democracy, based on rational 'enlightened' self-interest. Yet the postmodern critique has exposed how modernity itself imposes constraints of a traditional kind – culturally imposed, not freely chosen – around the quasi-religious modern icon of science. Its cultural form is scientism, which sociologists of science argue is an *intrinsic element* of science as public knowledge. The culture of scientism has in effect imposed identity upon social actors by demanding their identification with particular social institutions and their ideologies, notably in constructions of risk, but also in definitions of sanity, proper

> sexual behavior, and countless other 'rational' frames of modern social control…(Lash, Wynne, 1992)

In this scientistic connotation of modernity and of science as public knoweldge, considering the radicalization of risk societies as a open process of social change, the notion of reflexive modernization can be seen as the expression of a more optimistic alternative, in the panorama of social studies about modern and late-modern processes of rationalization and their consequences, and particularly through the focus on individual and collective agency in the relationships between agents and social structures: a sort of movement of freeing of agency from structures, in the reflexive dissolution of modern forms of power and authorities, because of the radicalization of their atonomisation, and, by them, for the explosion of dynamics of reflexivity which undermine the foundation of the scientific-rational principle as the absolute and universal model for human development and progress.

Thus, modernization, in its dimension of reflexivity, implies structural change, but above all changes of relationships between social structures and agents: at the highest levels of modernization, in Beck's perspective, agents and structures tend to be ever more individualized and automatised each other. In this situation, if the structures tend to act and reproduced themselves in the autonomy, independency, and automatisation which they constantly demand, particularly in the political rhetoric expressed by the exigency of technical governments of emergency and crisis, this developments can also imply that social agents can result less constrained by structures – beyond the institutional strategy of social repression and power confrontation with social conflicts arising in this phase of modernity, which constitute a fundamental part of this discourse, and that result to be central in Beck's idea of 'irony of risk society', that I tried to summarise in next subsection.

In Beck's perspective, in the structural changes in which the radicalization of reflexive modernization occurs, as well as structures do, social actors are pushed to act progressively more detached from structures, and the firsts are constantly challenged by kinds of individual choices which need however to be faced on a collective dimension, but in the rhetoric of uncertainty of the

current phase, the consequences fall on individuals. This situation produces friction in the relationships between structures and subjects, and the characterization of these relational forms can have different social evolutions. One of the most suggestive idea can be to look at these processes of change as a very reflexive social dynamics of ‘taking distance’ from ‘our’ society, the modern society, and considering the fact that, in the radicalization of the model of late-modern progress and development, can occur a profound loss of sense and social shared meanings upon which can be deal the reproduction of social relational processes between structures and agents. Given scientific meanings as the basis on which late-modern societies try (again and again) to face the development and progresses of their ‘civilisation’, ‘lay’ citizens, institutionally considered mainly for their ignorance and inability of a fully understanding of scientific facts, result to be however exposed directly to the consequences and perverse effects of these processes. This is because they have continuously to choose, through the reflexive process in which all the social system is immersed, and thus through a self-confrontation with the uncertainty of the system. Ultimately they have constantly to demonstrate to accept and to be accepted from the structures of power, showing whether they believe and act in the ways in which structures pre-ordinate social life, or if they would prefer to act in different and very often opposite ways respect the line of the modern model of development (all of these processes, however, in the space of social and public freedom that, in any case, result to be reduced through the processes of scientification and rationalization of modernity).

> Thus structural change in the private sphere results in the individualization of social agents who then are forced to make decisions about whether and whom they shall marry, whether they shall have children, what sort of sexual preference they might have. Individuals must then, free of these structures, reflexively construct their own biographies. In the sphere of work the process of structural change leads to individualization in two senses, through the decline first of class structure and second of the structural order of the Taylorist workplace. The resultant individualization again opens up a situation where individuals reflect upon and flexibly restructure the rules and resources of the workplace and of their leisure time (Lash, Wynne, 1992, p. 2).

Considering the GMOs case study, the processes of reflexive modernization which are involved in biotechnology enterprise induct very often individual and collective social agents to take the

distances from the policy and politics, yet in the alienation in which they are bound by the scientification of the debates. There is, again, an ambivalent dynamics: on the one hand, the scientification and auomatisation of economictechnoscientific system of regulation of risk and innovation alienate the 'lay' social agents and meanings from the dominant agenda. On the other hand, these same processes of biotechnological reflexive modernization bring with them the diffusion of controversial and critical and critic public reflection, concern, dissent and mistrust in regard to economic, scientific and political behaviors in framing, assessing and managing risk issues. The intrinsic reflexivity of GMOs processes of modernization opens social reflection on the dimension of authority accountability, independency and autonomy of power and regulator structures of late-modern society. This increasingly diffusion of public mistrust, skepticism and social 'reflexive' reflection intensify and make more visible the crisis of modern structures of power, in which 'publics' and 'lay' citizens result to be ever more alienated by the scientification and autonomisation of the social structures of power, and at the same time distant and released from institutions. Almost as consumers-citizens[20] – and here a strong democratic restriction of the conceptualization of citizen – that 'can' choice between GMOs or not GMOs, even in the involuntary contamination which is controversially supposed to happen from the spread of GM products in the environment, and very often in opposition with institutions' power, in regard to the public regulation of the risk of technoscientific innovation, development and progress.

The GMOs controversy shows also how, in the reproduction of these dynamics, the institutional authorities of late-modern societies are trying to negotiate and regain their credibility and legitimation by splitting in two differences area of policies the field of regulation of GMOs-risk controversy. On the one hand the reproduction of the GMOs policy exclusively as *science-based* policy where the scientific assessment and management of risk is the core of political-scientific action, and where technoscientific agents have, mainly, the function of distinguishing opinions and purely judgments from scientific evidences and meanings, with the result of alienating any extra-

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scientific argumentation from the table of decision making. On the other hand, in the emersion and reinforcement of public mistrust and skepticism, resistant and delegitimizing processes, through the systemic uncertainty and incapability of the risk governance, with particular regard to the European context, there is an intense promotion of policies of public understanding and engagement with science, which are explicitly expressed, by European and national governments, as a political attempt in order to create a field of 'policy-experiments' where to re-construct public consensus, trust and scientific acknowledgement about risk issues and public concern. Nevertheless, the reflexive processes expressed by the creation of institutionalized channels of communication and interaction between science, politics and public, between scientific and social meanings about GMOs and risk controversies, is not implying so far an institutional openness to the reflexivity in the main institutionalized processes and arenas of GMOs decision and policy making.

Thus, summarizing the view of Beck through this account on the European regulation of GMOs, in general, the shift from industrial modern societies and risk societies consists in the fact that, in the firsts, the basis of operation is the production and distribution of goods (and, then, increasingly services); rather in the seconds the diffusion-distribution of 'ills', risks and harms represent the foundation on which power relationships are developed. Furthermore, on the basis of the empirical case which I'm trying to introduce and support in this theoretical reconstruction, focusing on this shift there is the possibility to observe different kinds of *perverse effects* of modern social systems, which are referred not only to the multiplication of environmental crisis, food security controversies, and public debates about the safety of the technoscientific products and processes with which we are constantly in contact. Particularly in the explosion of the social dissent produced by the current and diffuse public mistrust of scientific, commercial and political risk and innovation policies, the radicalisation of reflexive modernisation can also mean and regard the *perverse effects* and the implications of risk society on the democratic constitution of the politics and policy of governments of risk. In this sense, one of the perverse effects of the radicalisation of the processes of modernisation on the democratic systems and constitutions of late-modern societies can be an

undemocratic drift dealt by forms of scientific despotism ever more reinforced by scientist ideologies. Nevertheless, in the same radicalisation of reflexive modernisation, there is also the possibility of a radicalisation of social reflexivity and reflection on the critical aspects of the governance of risk and consequences of modernisation, in globalising societies. This radicalisation of crisis and conflicting elements can take the form, from this perspective, of a fundamental change in the relationships of power and power distribution in late-modern societies. As Beck argues, these developments can occur not only because most of the consequences and risks of modernisation act and take place on a global level of diffusion, as in the cases of environmental crisis, biotechnological contamination, food risks, nuclear accidents; and because risk society, in terms of the distribution of global risk, can be conceived without a rigid division in social classes, for the potentiality of the dangerous and hazard that can ubiquitously affect any subjects, sometimes regardless from their incomes. They can happen also because the current radicalisation of modernisation's processes can involve the radicalisation of social reflexivity and reflection, through the formation of individual and collective self-confrontation, awareness and consciousness about crucial and critical public choices which, ultimately, fall on the individuals. Thus, in next pages, through the focus on the rhetoric of risk, as the other key interpretative element of Beck's approach to the current crisis of late-modern society, I take particularly into account these constitutional changes and (perverse) effects in the relationships between social structures and social actions and agents in risk society.

The bitter irony of risk society: the 'risk' of the radicalisation of social reflexivity (and reflection)?

> Modern society has become a risk society in the sense that it is increasingly occupied with debating, preventing and managing risks that it itself has produced. That may well be, many will object, but it is indicative rather of a hysteria and politics of fear instigated and aggravated by the mass media. On the contrary, would not someone looking at European societies from outside have to acknowledge that the risks which get us worked up are luxury risks, more than anything else?.... Are modern societies not distinguished precisely

> by the fact that to a large extent they have succeeded in bringing under control contingencies and uncertainties, for example with respect to accidents, violence and sickness? The past year has once again reminded us, with the Tsunami catastrophe, the destruction of New Orleans by Hurricane Katrina, the devastation of large regions in South America and Pakistan, how limited the claim to control of modern societies in the face of natural forces remains. But even natural hazards appear less random than they used to. Although human intervention may not stop earthquakes or volcanic eruptions, they can be predicted with reasonable accuracy. We anticipate them in terms of structural arrangements as well as of emergency planning. (Beck, 2006:332)

The proliferation of public discourses on risk, the very often 'hysterical' focus on its scientific preventions and management, and the consequent production, in late-modern society, of 'structural arrangements' and 'emergency planning' in order to face the uncertainty as it is perceived in modern world, are the elements which describe the current risk societies: as the product of unseen reflexive processes of facing the consequences and current phenomena of modernization, still in the claim of anticipating nature with human intervention. The dimensions of irony of risk society introduced by Beck are particularly traceable through the structure of the discourses of risk controversies and in those fields of policy making defined as *science-based* polices. As Beck (1986; 2006) argues, one of the most appropriate examples in order to describe these aspects of ironic reflexivity is endowed with the debate of climate change, and by all the risk controversies of late modernity, as well as those related to "*recent development in nuclear, genetic, reproductive, and communication technology*" (Adam, Beck, Loon, 2000).

Particularly in this kind of grounds of scientific innovation and public debate, the constitutive element which re-prefigures modern industrial society in risk society is remarkable in the current production and distribution of risk, hazard and harms, in which generally the economictechnoscientific processes of production and distribution of goods and services occur: in the proliferation of risks and hybrids, risk society is reproduced through the establishment of a systemic emergency governance of the uncertainty of modern social system. As Beck writes about the character of reflexivity of risk society, the irony of those kinds of risks proliferating in late-modern societies is intrinsically connected to the processes of development and progress, and this is expressed partly through the predominant space which risk debates have in public sphere.

Here part of the irony: through the mechanism of scientification of polity in situations of emergency, for some aspects, even the character of reflexivity is partially obscured. Considering the current form of scientism in policy, the scientistic modern linear model in risk policy seems to be reinforced by the political and economic trajectories and the actions of scientific, political, economic institutions of power. This is because, particularly in this sort of normative discourses about risk, forms of technoscientific knowledge's domain, ambivalently, prevails cognitively both in the development of this kind of risks, and in the processes of reproduction of public meanings and representations in the construction of structural arrangements and 'emergency planning' which redefine in technoscientific terms the frame of polity of current societies.

This disposition of power, through this continuous division and re-demarcation of hierarchies between fields of knowledge, has constituted the core of industrial modern societies, and following Beck's argumentations, it cannot represent the answer for the 'struggles' of this phase of modernity. Nevertheless, the scientific disposition of governmental power ambivalently shows and partly obscures the reflexivity which emerges through the processes of modernization, while hybrids and risks continue proliferating, in the claim of scientific domain of their management, in a play of light and shadow which sometimes shows and sometimes obscures the impossibility of scientific organization and control of social and natural life.

This situation is shown in the GMOs case study: in fact, it highlights the friction between structures and agents and makes visible the connection which can be between reflexivity and social reflection, that it can be expressed also through processes of social alienation, detachment, public resistance which put in conflict power structures with citizens. This produces political and scientific different reactions and strategies, and in this conflicting situation, the ironic rhetoric of risk has a crucial role in the processes of maintenance of social order in the dynamics of social change. In the name of public security, unfolding scientifically the management of crisis and emergency, democracy can be suspended.

Through this bitter irony of risk society, this form of scientific dominance results taken for granted and justified by the strong focus on the (rhetoric of) risk, and by the constant claim of the necessity of scientific unfolding of policy and politics. In the current governance of risk society, risks implies the necessity of scientific assessment and management through the institutional pre-disposition of form of scientific domain as an urgency for the control of uncertainties, accidents, sickness and violence. In this institutionalization of the management of uncertainty, risk is reframed as a situation of social fear, anxious and public concern, where, in this way, consequently, the 'risk', for power institutions, is the explosion of public 'irrationality', dissent and resistance which can derive, rather, from the unseen and intrinsic reflexivity of risk controversies.

> In 1974, about forty-five years after the discovery of the cooling agent CFC, of all things, the chemists Rowland and Molina put forward the hypothesis that CFCs destroy the ozone layer of the stratosphere and, as a result, increased ultraviolet radiation would reach the earth. The chain of unforeseen secondary effects would lead to climate changes, which threaten the basis of existence of mankind. When coolants were invented no one could know or even suspect that they would make such a major contribution to global warming. Whoever believes in not-knowing (like the US government) increases the danger of climate catastrophe. Or put more generally: *the more emphatically the existence of world risk society is denied, the more easily it can become a reality.* The ignorance of the globalization of risk increases the globalization of risk....The irony of risk ...is that rationality, that is, the experience of the past, encourages anticipation of the wrong kind of risk, the one we believe we can calculate and control, whereas the disaster arises from what we do not know and cannot calculate. The bitter varieties of this risk irony are virtually endless; among them is the fact, that, in order to protect their populations from the danger of terrorism, states increasingly limit civil rights and liberties, with the result that in the end the open, free society may be abolished, but the terrorist threat is by no means averted (Beck, 2006:330-31 – the italic is mine).

According to this perspective, an important dimension of the irony of the risk society consists in this reduction of freedom of individuals and citizens, in the name of their security and by the predisposition of states of necessity and emergency which are expressed by the domain of technoscientific assessment in the politics of national states, but considering the global dimension of late-modern risks. I shall argue that this point addressed by Beck is strictly connected to the paradigm of the state of exception of Agamben (2004), and his idea of the suspension of the rule of law and restriction of democratic freedom of citizens in the crisis of modernity. As I tried to deepen in next sections, the rhetoric of the emergency of security, the necessity to control the 'controllable'

by reproducing ‘uncontrollable’ risks, make the governance of risk and crisis of modern society, in the radicalisation of its processes, as a representative example of the forms of scientific despotism that puts at risk the democratic system. This is the particular dimension of irony of risk society on which I focused on in this research, within the wider debate about current risk controversies of contemporary societies, and particularly through the very typical case of the GMOs policy.

In effect, risk issues represent currently a theoretical and political intricate web which puts in connection several theoretical and material elements and dimensions of the crisis of modernity and industrial society. The current dominant discourses of risk, particularly in public sphere, arenas of policy and political agenda, show very representatively the persistence, in current late-modern democracies, of instrumentalist, reductionist and modernist approaches in the relationships between risk, hazard and society: the domain of technoscientific assessment and management, the restriction of several levels of freedom in the name of an abstract principle of security, the alienation of public meanings from the spectrum of possible ‘rational’ choices in framing policy and politics, are all elements which show the forms of scientism in risk discourses and rhetoric. Thus, one dimension of the *bitter irony* of risk society may consist in the fact that, in front of the more or less explicit public perception of (even scientific) uncertainty, made visible by systemic ‘uncontrollable’ of the processes of innovation and development, the institutional remedy seems to be an increasingly high dose of despotic scientism, which coincide with a restriction of democratic choices and public participation and freedom in the scope of guarantee the security and the maintenance of public order, in front of the risk of public ‘irrationality’.

> The narrative of risk is a narrative of irony. This narrative deals with the involuntary satire, the optimistic futility, with which the highly developed institutions of modern society – science, state, business and military – attempt to anticipate what cannot be anticipated. Socrates has left us to make sense of the puzzling sentence: I know that I know nothing. The fatal irony, into which scientific-technical society plunges us is, as a consequence of its perfection, much more radical: we do not know what it is we don’t know – but from this dangers arise, which threaten mankind! (Beck, 2006:329)

In the GMOs controversy the narrative expressed by the sentence "*we do not know what it is we don't know*" is very meaningful, because it can be useful to highlight the tension embedded in the ambiguity expressed by the rhetoric of risk and the necessity of the technoscientific control of portions of controllable of what results uncontrollable and unpredictable. In this shift expressed by the rhetoric of "*we do not know what it is we don't know*", in risk society Socrates' sentence seems to be translated into a form of fear of what we do not know (about what we do not know): ironically the focus is not on the fact that knowledge is unlimited in the human recognition of its own limits, or on the recognition that in knowing we discover (particularly) that we do not know, or on the fact that we are limited knowledge subjects which can try to front this limit just through the recognition of these lasts, as Socratic position seems enigmatically to point out. Rather, in the evolution of risk society, the focus is on a sort of pressure of knowing what we don't know about what we don't know, stressing the elements of risk of this non-knowledge and on, in general, the dangerous of human ignorance (without recognition of the fact that the most terrible harm is the obscuration and the non-recognition of the limits of human knowledge). It is as if the emphasis is on a dimension of fear of (scientific) ignorance and on the fact that we do not recognize the implicit limit of human knowledge. There may be, for example, a difference in the formulation of this same sentence as follows: *we know that* "*we do not know what we don't know*". Here, the point is: do we just do not know about what we don't know, or also, *we know* that we do not know what we don't know? Is there the (reflexive) recognition of the fact that we don't know? Or in the double negation with which Beck expresses his sentence, he is suggesting a stronger dimension of fear and risk of non-knowledge and ignorance, in the maintenance of modern system, and not the recognition of the limits of knowledge as it is in Socratic idea which Beck uses to express the shift toward risk society?

Thus, in the emergence of these questions, a key point that Beck articulates in order to investigate the characteristics of the current crisis of modernity focuses on this 'obsession' and 'hysteria' relating to our non-knowledge of what we do not know, which ultimately results to be a constitutive

element in the reproduction of power in late-modern societies: the governance of risk/security is strictly connected to the affirmation of the modern state as a state of necessity of scientific calculation of risk. This paradigm of government is a typical product of modernity and it has to do with the ways by which modern societies tries to face several kinds of social changes that are characterized as crises of social systems and which arise through the processes of modernisation. The centrality of the (scientific) management of risk as a connotation of the governance and government of security of modern states is described particularly in the connotation which Beck attributes to the kind of risks of this phase of modernity: these are specifically defined as the probabilities of physical harm due to given technological or other processes.

Considering this definition and applying it to the case study of this research, biotechnological risks are included in the spectrum of these harms, being involved in the dynamic of scientific research and development of life science, and for the intrinsic risk which can derive by the biotechnological processes of life manipulation. Through this constitutional connotation of GMOs as a risk policy, by the exploration of this case, according with Beck's perspective, it is possible to highlight how it results implicit that, in these processes of innovation and development, technical experts and technoscientific knowledge are given as the main actors in the definition of public agendas, hence constructing the policy and political debate through the imposition and disposition of several limitations and *a priori* condition on risk discourses.

Nevertheless, as Beck describes it, the current connotation of risk is related to those harms produced by technoscientific innovation's processes and by other causes and factors of modernization: in his view, the technoscientific reproduction of risk is conceived as a social process, as well as the (technoscientific, economic-industrial, political) systems in which risks are collectively created. At the same time, the global extension of scientific risk management triggers the development of a web of social reflexive relationships between science, technology, politics, economy and society. Thus, it can mean the manifestation of an intrinsic dimension of friction and conflict between the global

and globalizing area of expansion of late-modern risks and their current scientific management and the development of their several implications on the different local democratic systems of power.

Furthermore, following the definition of the irony of risk of late-modern societies, one of the main harms, in the dominance of technoscientific intensive and reflexive activities, is that the scientific disposition of polity reproduces ambivalently forms of public detachment and alienation of social agents from the institutions, and, at the same, an institutional dependency upon technoscientific agents, discourses and knowledge, which, ultimately, works legitimating polity, and subordinating social reasons and 'rationality' to the scientific domain of risk issues, policies and decisions.

Strictly connected to this, and considering these dimensions and constitutional implications of the reproduction of risk's political and scientific rhetorics in the reproduction of late-modern modern power, in risk controversies the issues of public trust, authorities' credibility constitute a crucial terrain on which can be the materialization of the possibility of radicalization of social reflexivity and reflection in the current processes of modernization and technoscientific innovation.

Following this direction of analysis, through this theoretical background I intend to underline the fact that issues about technoscientific risks are, in most of the cases, are institutionally framed as problems of public trust; and it means that this sort of risks are able to generate and diffuse, in the institutional exigency of governance harms and consequences of innovations' processes, the form of prevention and political strategies against the risk of public resistances, mistrust and disengagement with authorities: in this sense, the risk becomes the possibility of the explosion and radicalization of reflexivity in risk society.

From this perspective, with particular regard to the GMOs controversy, it is possible to connect the emerging field of policy of understanding and engagement with science, within the European knowledge societies, to these wider processes of public disengagement and mistrust in scientific and political authorities particularly in risk assessment and management, and in the explosion of the

consequences of the processes of development and progresses that the power institutions have promoted and supported. The development of these fields of policy, from the linear and deterministic model through which they are institutionally conceived, seems to reveal the institutional fear of social reflexivity, and how "*reflexivity is excluded from the social and political interactions between experts and social groups over modern risks, because of the systematic assumption of realism in science*" (Lash, Wynne, 1992). It is a partial recognition of the unseen and irreducible reflexivity, but it is also an obscuration if we look at the ways by which technoscientific subjects are called to interact with public, citizens, politicians, and social groups: these interactions occurs through a disposition of the debate and policy through the domain of technoscientific authority on the subjectivity, partiality, irrationality of public and 'lay' social actors.

In these terms, in the GMOs controversy reflexivity is partially obscured by the institutional scientification of the field of policy behind which the model of supremacy of scientific rationality and subordination and alienation of other forms of public reasons, through which the policy is managed, does not permit the development of reflexive relationships between technoscientific subjects and 'lay' citizens, in the definition of GMOs policy just as a *science-based policy*. Through this definition a form of reification of the paradigm of risk occurs, as a model of government based on the scientists' exclusive competence of domain on risks, and the naturalization, through the scientification of the debates, of risk as a natural and physical assumption of our societies. In this naturalization, any traces of the social dimensions of risk issues seem to be banned, through the affirmation of the necessity to maintain scientifically the order of the decisions and policy.

> The completely unreflective imposition of these bounding premises on the risk debate only polarized the issue around the realist distraction concerning the truth value of scientific propositions, and polemic about the alleged irrationality of the farm workers[21] and corruption of scientists and regulatory institutions. A reflexive learning process would have recognized the conditions underpinning the scientific conclusions, drawn out the social situational questions which they implied, and examined these with the benefit *inter alia* of the different forms of knowledge held by people other than scientists. This reflexive learning process would have necessarily meant negotiation between different epistemologies and subcultural forms, amongst

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> different discourses; and as such it would have entailed the development of the social or moral identities of the actors involved (Lash, Wynne, 1992).

In this view, current institutional narrative and rhetoric of risk can be seen as a web of themes in which, in the radicalization of the processes of modernization, for the high risk of radicalization of social reflexivity and reflection on the consequences of innovative processes, the same element of reflexivity is obscured by the management of the more recent dynamics of modernization and their consequences. This is because the crisis of legitimation of authority institutions is supposed to depend on the explicit and full recognition or negation of the impossibility to deal the effects of the processes of development and progresses of modernity and late-modern societies.

In this account on the dynamic of legitimation, and crisis of legitimation, of late-modern authorities, through "*the realist distraction concerning the truth value of scientific propositions*", the core of next section consists of an analysis of those forms of obscuration of the processes of co-production of normative knowledge which, from the perspective of this research, rule particularly in risk governance. The paradigm of co-production illustrated by Jasanoff (2004) can be read as an approach to the study of knowledge and power based on the idea of reflexivity: this is because in the co-production paradigm the focus is on the processes of social self-confrontation between different fields of knowledge and power of modernity, and also self-confrontation with the hybrids (forms of knowledge-power) which are produced through the more or less invisible dissolution of scientific divisions of modern social orders. For example in the GMOs field of policy, through the reflexive approach of co-production is possible to interpret the different relationships between science, politics and public through the intersections which connect all these spheres of social action, rather than to treat economic, industrial, scientific and political structures and social agents as independent and autonomous each other.

The obscuration of the co-production processes derives from the scientification of policy and the claim of independency and autonomy, particularly, of technoscientific agents and structures in policy and politics; this connection of processes are then linked in turn to the dynamics of

reproduction of power: within public sphere the independency of scientific authority seems to represent that character which confers value of truth to scientific argumentations and evidences. Crucially in risk assessment and management on the basis of this structure of power, political decisions and policies are currently legitimated.

Nevertheless, social frictions involved in risk controversies, putting in crisis this model, show, rather, how it is ever more difficult to affirm the independency and autonomy of technoscientific activities that are completed embedded in the industrial-economic processes of modernization and in public sphere, through the scientification of governmental and political dynamics of maintenance of public order. In these dynamics, technoscientific innovation and knowledge, particularly in such field of life manipulation[22], act as a powerful cultural and political agent of social change and, at the same time, as a stabilizer of social order.

The reflexivity implied in the co-production approach permit to look at this dynamics, avoiding any scientific or social determinism. In this sense, I interpret the obscuration of the processes of co-production of normative knowledge as part of the dynamics of obscuration of reflexivity in the current policy making of risk: both processes occur through the affirmation of forms of scientification of policy and through the construction political legitimation on the basis on the independency of scientific agents. Scientification obscures both the forms of reflexivity of the GMOs controversy, and the processes of co-production of normative knowledge which, rather, are the result of tangled relationships between economic, technoscientific and political structures and

[22] "*Major technological innovations by their very nature entail seismic changes in social organization, behavior and beliefs. The printing press, the light bulb, the automobile, the atomic bomb, the personal computer — and most recently our ability to cut and splice the genes of plants and animals — have brought with them profound shifts in the ways that individuals and communities think, act, and conduct their relations with one another. (….)The history of technology is a history of adaptation in both structure and action and in ideas as well as in material instruments and capacity. The new genetic technologies of the late 20th century offer at once a site for studying a revolutionary technological system in the making and an opportunity for policymakers to reflect on how to use these novel techniques to further human welfare. Easily the most important scientific discovery since the breakthroughs that characterized the internal make-up of the atom, the unraveling of DNA's molecular structure has enabled changes, both real and imagined, in a wide variety of human practices – in agriculture, medicine, environmental management, human reproduction, and, most important for our purposes, criminal justice. (…) Not only do we only imperfectly comprehend its behavior and potential, but we are unsure what rules should be crafted to socialize DNA as a responsible participant in our technological culture*". (Jasanoff:2004, pp. 337-355). "DNA's Identity Crisis," in D. Lazer, ed., DNA and the Criminal Justice System: The Technology of Justice, Cambridge, MA: MIT Press, 2004, pp. 337-355.

agents: with public and through the reproduction of public consensus these social forces, and in this case technoscientific knowledge works constantly reproducing systematic uncertainty and ambivalence, while it is identified in the reproduction of power as the irreducible source of order and security. In this contradiction the crisis of the system is treated very often as a kind of fear of public ignorance and social resistance: thus, in this diffusion of several levels of fear, social contraposition and/or skepticism toward certain fields of policy are easily translated by power institutions into forms public and social resistance and treated as illegitimate positions in the state of emergency which is predisposed in risk issues.

> Ambiguity rules the day at this transition between millennia. In the advanced nations that spearheaded the industrial revolution, innovation speeds on, but there is also uncertainty, sometimes morphing into fear, about the long-term consequences of meddling with the fundamentals of nature or of human belief. (Jasanoff, 2002:254)

In the ambiguity and ambivalence of this current transition, the idea of coproduction represents an open path of sociological reflection which is in constant dialogue particularly with those theoretical interpretations that emphasize the constitutive relational dimensions of knowledge-power of modern societies, in the processes of reproduction of meanings, discourses and rhetorical dispositives of current social orders. Within this general focus, this approach tends to extend and cover unexplored fields of investigation and several paths of thought, through salient ways of interpreting power in knowledge society: which means trying to highlight the very often invisible role of knowledge, expertise, and technical and discursive practices composing the intricate relations among public authorities. The idea is that the normative knowledge which rules, particularly in risk controversies, in the crisis of modernity is the result of the hybridized relationships between scientific and political agency within different cultural contexts, rather than the product of the independency and autonomy on which institutions claim to legitimate their argumentations, positions and actions.

The co-production of normative knowledge: the constitutive relationships between knowledge and power in the crisis of modernity

> The dynamics of politics and power, like those of culture, seem impossible to tease apart from the broad currents of scientific and technological change. It is through systematic engagement with the natural world and the

> manufactured, physical environment that modern polities define and refine the meanings of citizenship and civic responsibility, the solidarities of nationhood and interest groups, the boundaries of the public and the private, the possibilities of freedom, and the necessity for control. (…) Whether power is conceived in classical terms, as the power of the hegemony to govern the subject, or in the terms most eloquently proposed by Michel Foucault, as a disciplining force dispersed throughout society and implemented by many kinds of institutions, science and technology are indispensable to the expression and exercise of power. Science and technology operate, in short, as political agents. (…) In what conceptual terms, then, should we discuss the relationships between the ordering of nature through knowledge and technology and the ordering of society through power and culture? How should we characterize the connections between the human capacity to produce facts and artifacts that reconfigure nature, and the equally human ability to produce devices that order or reorder society, such as laws, regulations, experts, bureaucracies, financial instruments, interest groups, political campaigns, media representations or professional ethics? (Jasanoff, 2004: 14)

The idiom of co-production of normative knowledge represents an interpretative approach aimed to describe the current deep and constitutive relationships between the spheres of technoscience, politics and citizens in the reordering of knowledge democracies. Through this idiom the main goal is to underline those cultural processes through which scientific facts and artifacts are placed at the centre of the reframing of the categories of nature, society, risk, security, work, citizenship, rights, politics, etc. Thus, the focus is particularly on the dynamics of production of political strategies and policies in which these socio-scientific categorisations, ordinations, re-ordinations and divisions between natural and social realities occur and are publically sustained and legitimated: that is, through the adaptation of structures-agents relationships to changes of social systems. Addressing these issues, through Jasanoff's analysis, I took into account particularly the different instruments of co-production of normative knowledge which characterise these processes of adaptation of power structures, for instance as *law, regulation, expertise, bureaucracy, financial instruments, interest* and *pressure groups, political campaigns, media representations and professional ethics*.

The paradigm of co-production represents an interdisciplinary theoretical approach which tries to make clear how the idea of nature, as well as the idea of society, are socially constructed through culturally situated acts, discourses, practices and exercises of social imagination: their realization and their normative aspects, particularly in knowledge and risk societies, appear as deeply connected to the development of science and technology and its role in policy making, and to those

controversial sociotechnical imaginaries (Jasanoff, 2006) which reflect the image of crisis of modern social orders. Paradoxically, for the importance which is attributed to science within public sphere and in the reproduction of social order, very often, technoscientific changes and innovation are represented as abstract and isolated from social dynamics, and technoscience comes to be disposed as the fundamental human activities and achievements, in the ordering of (the ideas of) nature and societies. In this disposition, I argue that there is an obscuration both of the same processes of coproduction and reflexive relationships between agents and structures of risk society. Thus, the emphasis on the idiom of co-production is placed in order to highlight how, deliberatively or not, very often both in intellectual and public debate, sociotechnical imaginaries are reproduced through a determinist vision for which technoscience deals in the production of dominant social meanings, and it is treated apart from the social processes of economic and political power and social order.

Another reason for which I take into account Jasanoff's approach is because through this idiom I can explore both a common international background in the management of risk, and, at the same time, the g-local and situated dimensions of development of the GMOs policy and controversy: in the GMOs policy this perspective allows to point out the fact that, in the necessity to face the reflexivity of biotechnology developments, particularly at the European level, on the international dimension there is the attempt to create a centralized and scientifically coordinated system of technical assessment and management of GMOs risk in order to overcome the difficulties which arise through the affirmation of practices of normalization of GMOs risk case by case, and in different economic, cultural, political and social entities. On the other hand, on local and national territories, beyond the common international basis of regulation dominated by the field of risk assessment, the forms of the coproduced ordering relating to GMOs take different and variegate implications according to the diverse cultural contexts and divergent relationships between economic, political, scientific structures and citizens.

Thus, in this dissertation I considered the idiom of co-production for its affinities with those sociological analyses which take into account both the dimension of reflexivity (Beck, 1986) and situatedness (Haraway, 1998) of knowledge-power. On the basis of these perspectives of analysis, Through the co-production paradigm I tried to reconstruct a sort of common framework, among different approaches in the ST debate, useful for the study of the relationships between knowledge and power in the ordering of society and in the exploration of crucial sociological categories as nature and culture, science, technology, politics and citizens, rights, and society. The centrality of the relationships between power and knowledge in contemporary democracies can be retraced in Jasanoff's idiom of co-production particularly if we look at the 'archeology' and 'genealogy' of this paradigm.

> Among social theorists, the one who perhaps most consistently sought to bring together the analysis of knowledge and power is Michel Foucault (1971, 1972, 1973, 1979), whose work has exercised growing influence on research in S&TS. Foucault's imprint is particularly apparent in work, including contributions to this volume, that deals with classification, standardization, and the accrual of power by institutions that have the capacity to discipline people's bodies, minds, and forms of life. His monumental legacy, however, is less well-suited to exploring how diversity keeps reappearing and reasserting itself, even in the most entrenched institutions of modernity, such as expert bureaucracies. (Jasanoff, 2004:34)

The co-production of knowledge-power or normative knowledge is identified as that way of describing the constitutive relationships between the reproduction and hierarchisation of knowledges and the dynamics of change and maintenance of social order. This idiom for several aspects represents an extension of Foucauldian approach[23] to the disciplinary history of modernity: the representation of the coproduction of normative knowledge aims to underline the (common) history of modern power as an intricate set of mechanisms and processes of rationalisation and reciprocal reinforcement between the different fields of social actions (economic, political, scientific, juridical, governmental, public), which through the principle of scientific division of modernity have been reproduced as if they are independent each other. Beyond this appearance, power is rather represented as a tangled and invisible node of situated relationships between

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structures, apparatus and dispositives of normative knowledge which perform – and are performed by – identities, discourses and models, with particular regard to those that dominate and rule in the current reproduction of biotechnology risk management.

Therefore, on the one hand, through the idiom of co-production it is possible to identify and treat power in modern democracies for its physiognomy of normative knowledge, as a common factor and form of power in several and situated supranational, national and local contexts. This permits to highlight those forms of power of modernity expressed through the exercise of authorities scientifically rationalised which tend to act and interact with social agents, disciplining bodies, institutions and forms of life.

On the other hand, the idiom of coproduction, particularly through its exploration within the ST debate about technoscience and social order, can add to Foucauldian's instruments of analysis a view on the different and localized implications of these dynamics, and, generally, on how the situatedness of cultural processes of production of scientific and normative knowledge let arise and is stimulated by several structure-agent relationships, even in the most rigid, scientifically-rationalised social order.

In the co-production idiom seems to be implicit a particular attention and tendency to reflexive comparative perspectives of analysis of different political cultures and civic epistemologies[24], and this paradigm can be interpreted as an additional theoretical, methodological and operative instrument of research to the general framework constructed by Foucault, in the ways in which he has developed the archeology and genealogy of the category of knowledge-power[25].

This specific element of the co-production approach to the study of technoscience and social order represents one of the most important reasons for which this paradigm results particularly useful in this research: following this attention on the situated dynamics of coproduced normative

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knowledge, through the comparison between Italy and Britain, within the GMOs European background of regulation, the aim of this research is to investigate the dynamics of co-production, on the basis of these two different cultural, political, scientific contexts and, and particularly how these extensive and common dynamics of coproduction are in both cases partially obscured through different paths of scientification of polity; and also, how the processes of scientification/obscuration can give different results, in terms of public decisions and courses of social and political action and policy.

Through the lenses of the theoretical approaches that I'm presenting, in both the national contexts, as well as at the European level of regulation, we can observe, in the historical and cultural relationships between knowledge and power in the reproduction of authoritative structures, how the regulation of GMOs occurs through the establishment and reinforcement of a system of government based on the necessity to frame the GMOs issue as a science-based risk policy, which means through a scientification of social orders of discourse and action, and, thus, obscuring both the processes of coproduction, and the dimensions of reflexivity intrinsically reproduced through biotechnological development. Nevertheless, in the obscuration of extra-scientific meanings e rationalities behind the predominance of technoscientific assessment and management of policies, and within the different conflicts, frictions and social manifestations of public mistrust and skepticism in current economic, scientific and political processes of regulation of risk issues, several and different implications and (short-term) political and normative results can emerge in the situatedness of cultural evolution of these processes. On the basis of the scientification of policy, in the processes of coproduction of social order through the ordering of biotechnological knowledge, in Italy we have a policy based on the opposition of the Italian government to GMOs, which is motivated on scientific ground that is on the insufficient scientific evidences which cannot support a positive political decision. Thus, Italy is refusing the commercialization of GM products in the Italian territories, even for those kinds of GM products, particularly in agro-industrial sector, which are already authorized by European authorities.

In Britain, the governmental position about GMOs is stated to be taken by the implementation of a science-based policy, mainly focused on the issues of risk deriving, potentially, by the spread of GMOs into the environment. This asset, through a scientification of the GMOs policy, has produced the result of a governmental position pro-GMOs, which has in turn generate and has been generated through specific and situated relationships between scientific, political, economic structures and agents. In Britain on the basis of scientific evidences which show that there is not 'too' high level of hazard and risk in GMOs commercialization and diffusion, the political decision results to be the opposite of the Italian government.

These differences take place in the cultural singularities of the relationships between scientific and political community, and their relationships with public sphere and situated economic dynamics. With particular regard to the British context, the GMOs debate and controversy has emerged in this country in a public atmosphere of social crisis, that is in the same decades of several environmental and food crises in Britain, above all the BSE crisis, in 1996, in which there was a strong intensification of social conflicts and effects of public mistrust and skepticism toward the governmental attempt of managing these crises exclusively through scientific instruments, even when these lasts are resulted, very often, insufficient in order to face the risks and implications of several processes of modernization in UK. In any case, about GMOs the governmental decision seems to go toward an opposite direction respect public attitude. Also confronting this situation with the Italian regulation, although it is still made on the basis of scientific ground, in Italy this scientific disposition of the structure of power in the processes of decision making has produced however a kind of policy completely different from the British context: the result is a decision of zero tolerance to GMOs in Italy.

On the basis of a common process of scientification of the reasons which are used to make a public decision, in Italy and Britain we have two opposite political results which are stimulated and stimulate in turn different political, scientific, social reactions and courses of action. For example, in

Britain, considering the conflicting relationships between public and governmental position about GMOs, we can observe a stronger necessity of the UK government to answer to the visible public mistrust and skepticism which make, in terms of democracy, seriously partial the legitimation of such policies and decisions. Through this divergent situation between Italy and Britain diverse mechanisms of re-adaptation of authoritative structures and institutions in their relationships with citizens are triggered. The necessity to implement policies of public understanding and engagement with science can be considered as the typical and stronger reaction of British system of power in facing public mistrust and social conflicts in risk controversy. Rather, even though this field of policy of public engagement with science in risk controversy is part of the European strategy of risk management and scientific governance, the Italian government has not developed the necessity to implement these sorts of policies of public participation to 'scientific' decisions. And, again, in this different course of actions, as I tried to show in the presentation of the comparative analysis, through this divergent evolution of the GMOs policy, going deeper, we can retrace common and diverse, at the same time, types of social actions which I considered as at the centre of (the obscuration of) the processes of co-production of normative knowledge.

Considering all these reasons and aspects, following Jasanoff's argumentations, in this second theoretical part I described the developments of the idiom of co-production as they are expressed within the ST debates about technoscience and social order. Thus, as Jasanoff highlights, I intended to use this approach as an analytic instrument in order to reconstruct some common elements within social studies of knowledge and power. Following Jasanoff's work, through the conceptualization of the dynamic of co-production it is possible to retrace the whole sociological debate which constitutes the field of social study of science and technology and social processes of scientific knowledge production and its constitutive role in modern and late-modern societies. From this perspective, ultimately, I aimed to connect the centrality of the (foucauldian) category of knowledge-power in STS to particularly those sociological researches which focus on social processes of construction of modern authorities, as scientifically-rationalised structures of

disciplining of social bodies and agents currently challenged by the processes of reflexive radicalization of modernity.

On the basis of these elements, in the next pages, the analysis of co-production's idiom is structured, first, through a conceptualization of this paradigm within STS debate. After this theoretical reconstruction of the field in which the idiom of coproduction emerged, I aimed to summarise the main elements and instruments of co-production which are expressed by Jasanoff's idiom and that can hold together different dimensions which arise in the social studies of knowledge-power in the GMOs case study.

The idiom of co-production of normative knowledge in the social study of technoscience and modern social orders

One of the most important goals expressed by Jasanoff's idiom of co-production consists in the attempt to consider the current ST debate on the basis of its crucial focus on the studies of science and technology as cultural formations and expressions, social authorities and also as political agents. From a theoretical viewpoint, the co-production idiom might represent a sort of synthesis of the different sociological interpretations about science, technology, power, authorities and social orders which constitute a growing component in STS. Following Jasanoff's perspective, within this sociological field and considering particularly those theoretical approaches which focus on dynamics of co-production, it is possible to distinguish two main streams of thought: the constitutive[26] and the interactional[27] approaches which *"deal, respectively, with the emergence of*

[26] "*The former is primarily concerned with the ways in which stability is created and maintained, particularly for emergent phenomena, whether in a particular site where knowledge is made, such as a research laboratory, hospital or legal proceeding, or around a novel technoscientific object, such as the human genome or a periodic table for chemicals. At the most basic level, the constitutive strain in S&TS seeks to account for how people perceive elements of nature and society, and how they go about relegating part of their experience and observation to a reality that is seen as immutable, set apart from politics and culture. This body of work is most closely related to metaphysical concerns in the philosophy of science, because one cannot discuss the constitution of nature or society without resolving questions about what it means to be natural or social, human or non-human. Co-productionist accounts, however, are not content simply to ask what is; they seek to understand how particular states of knowledge are arrived at and held in place, or abandoned*". (Jasanoff, 2004, p.36)

[27] "*The interactional approach (…) is less overtly concerned with metaphysics and more so with epistemology – or less with what is and more with how we know about it (Hacking 1999:169). This line of work takes for granted that, in most exercises of world-making, neither science nor society begins with a clean slate but operates always against the backdrop of an extant order, in which people already "know" in pragmatic terms what counts as nature or science and what as society or culture. Nonetheless, boundary conflicts about where these domains begin and end continually arise*

new socio-technical formations and with conflicts within existing formations" (Jasanoff, 2004, p. 29).

Beyond the specific directions of these co-productionist streams, within the STS field the main and common effort is directed to the understanding of the ways in which new sociotechnical material and discursive formations emerge and how these can arise through social conflicts and can be reproduced through the affirmation of public controversies and frictions between social agents and structures of power. Trying to consider both these connected dimensions of analysis dealt by the idiom of co-production, through the observation of these processes of re-ordering of nature and society, the focus is simultaneously on the reproduction of the conditions of stability and social change of social systems.

> A compelling body of scholarship has demonstrated that science and technology can be fruitfully studied as social practices geared to the establishment of varied kinds of structure and authority (Biagioli 1999; Jasanoff et al. 1995; Pickering 1995; Clarke and Fujimura 1992; Bijker et al. 1987; Barnes and Edge 1982). So viewed, the workings of science and technology cease to be a thing apart from other forms of social activity, but are integrated instead as indispensable elements in the process of societal evolution. Science, made social in this way, can be compared and contrasted with other exercises in the production of power (Latour 1999, 1988a, 1987). Increasingly, the realities of human experience emerge as the joint achievements of scientific, technical, and social enterprise: science and society, in a word, are *co-produced*, each underwriting the other's existence. (Jasanoff, 2004, p. 32)

The deep and quite recent work about *co-produced human experiences* as the result of technoscientific and social enterprise, in science and technology studies, addressing Jasanoff's perspective, very simply can represent the sign, by contrast, of the obscuration[28] of coproduction

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and call for resolution (Gieryn 1999). As well, the recognition of new phenomena often entails confrontation between competing epistemologies. Work in the interactional mode probes how human beings organize, and periodically reorganize, their ideas about reality under these circumstances. It seeks to elucidate the myriad mutual accommodations between social and scientific practices that occur within existing socio-technical dispensations during times of conflict and change. If constitutive analysis focuses in the main on the emergence of new facts, things, and systems of thought, then the interactional strain concerns itself more with knowledge conflicts within worlds that have already been demarcated, for practical purposes, into the natural and the social" (*Ibidem*).

[28] "*Can co-production serve the explanatory purposes that we have come to expect of theories in the social sciences? Can it provide normative guidance, or at least facilitate our critical interpretation of the diverse ways in which societies constitute, or reconstitute, themselves around changes in their apprehension of the natural world? Can the co-productionist approach ever predict? Recent work in science and technology studies strongly suggests that these questions can be answered in the affirmative, although modestly, especially with regard to prediction, and with due regard for persistent disciplinary divisions within the field that have tended to obscure some of its most general insights*". (Jasanoff, 2004, p. 33)

dynamics, theoretically and in power dynamics, by the persistent disciplinary divisions through which the modern order of knowledge and society has been established. In this research, this processes of partial, implicit or explicit and non deliberate obscuration of processes of co-production is read as a very salient reason for which, particularly in STS, through the explosion of the world of hybrids as sign of coproduces realities, it is strongly emerging and reinforcing the intellectual 'need' to make visible what is obscured by the modern model of disciplinary division of knowledge-power. This stronger emergency in social studies to focus on the character of co-production of power is read in this dissertation as an attempt to go beyond the representations of scientific knowledge as a neutral agent in public sphere, and of power as essentially sustained and legitimated through independent and autonomy authorities and rationalized bodies. Through the co-production approach, we can talk about a very constitutive relationship of reciprocity[29] between the legitimation of the order of knowledge and the legitimation of the social orders of modern society.

Thus, considering one of the main insights of this research, the emerging of co-production's approaches in STS can be interpreted as a trace of the obscuration of these same dynamics, both in social theory, and, particularly, in the way in which current late-modern societies reproduce their models of social organization and operation: legitimating public decisions and policies on the basis of the independency and division among power structures, and between politics, science and society.

Since its beginning, ST debate has been developed on the basis of the necessity to look reflexively at the co-produced 'nature' of the divisions between spheres of knowledge, power and social and natural facts. As Robert K. Merton argued, 'founding' the discipline of sociology of science, after the Second World War it started being quite impossible to study societal dynamics, social order, rules, norms, values and all the sociological categories of classical sociology, including political and

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state power, without considering the dominant normative structure of science[30] (Merton, 1942), and the social relationships embedded in the processes of technoscientific evolution of modern societies.

According to the idiom of co-production, In STS, particularly in their more recent developments[31], one of the analytic aims is to take into account the complexity of the object 'science' within sociological studies in which, social scientists, being called to an exercise and practice of reflexivity, are immerged, involved and are an integral part of both their broader object of study 'society', as well as 'science'. Considering this complex relationships between the object and subject of STS, within this field of knowledge, although there are numerous and interconnected subareas, trajectories and approaches of investigation, the idiom of co-production and its different declinations can represent a common perspective through which to look at the development of several narrations about the processes of social construction of technoscientific knowledge, without the intention of any determinism, but considering this social dynamic as a constitutive component in the reproduction of social meanings, authorities, structures and agents, and in the adaptation, changes and maintenance of particular kind of social relationships. In this constant exchange, confusion and tension between the ordering of knowledge and the ordering of society a co-produced form of power – or normative knowledge – takes shape. And in the social study of these intersections of knowledge-power Jasanoff's co-production idiom retraces and highlights a common element among the different co-productionist analyses which emerge in this field of social

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31 "With greater maturity, science studies as a field has moved to show that what counts as "social" about science is itself a subject of unsuspected depth and complexity. For example, early efforts to explain how controversies end, in both science and technology (Richards and Martin 1995; Nelkin 1992; Bijker et al. 1987; Barnes 1977), often represented closure as a negotiated sorting out of competing social interests. Such work assumed, along with mainstream scholarship in economics and political science, that society can be unproblematically conceptualized as composed of interest groups with clearly articulated (exogenous) positions and preferences. These interests, or stakes, were then invoked to explain the positions taken by different actors concerning knowledge claims and their technological embodiments. Newer work recognizes the inadequacy of interests as a primary explanatory category. Interests themselves have a social history: how they arise and are sustained are matters to be investigated, not taken for granted. The results of such investigation include, *inter alia*, a greatly increased concern with the standardization of scientific and social practices (Bowker and Star 1999), a sensitivity to the place of material agents in the production of stable knowledge (Galison 1996, 1987; Pickering 1995, 1992), a focus on the techniques of scientific representation (Hilgartner 2000; Lynch and Woolgar 1990), a growing appreciation of the influence of language (Dear 1995, 1991; Keller 1985), a preoccupation with the bases of trust in science (Irwin and Wynne 1996; Porter 1995; Shapin 1994), and heightened sensitivity to the ways in which knowledge achieves practical universality in widely divergent socio-political settings" (Jasanoff and Wynne 1998; Jasanoff 1986). (Jasanoff, 2004, p.)

investigation[32]. Both for the normative role of science in public sphere and for its normative internal structure, following Jasanoff's approach, the "making science"[33] is conceived "also" as a "political" activity, thus engaged in the reproduction of culture and power. In fact, For both the approaches – the constitutive and interactional or relational[34] – the coproduction's idiom represents, above all, an attempt to understand the social processes in which are reproduced those forms of knowledge-power which ordinate societies through the cultural naturalization of technoscientific categorizations and distinctions between nature and culture; and that, trying to transcend any form of social or technoscientific determinism[35] which can, rather, obscure the same co-production

[32]"Barnes (1988) came close to a co-productionist position in talking about the nature of power; the same human capacities for learning, responding and transmitting knowledge, he noted, are responsible for the creation of natural and social order. His two orderings are more interactional than mutually constitutive in the sense implied by other observers of co-production, and the role of material objects in constituting order is left vague at best. By contrast, Daston (2000), introducing a collection of essays on the "coming into being" of scientific objects, calls attention to their ability not only to focus scientific inquiry but also to crystallize emergent and socially salient features of their cultural contexts. These objects, like people, have "biographies"; they are "not inert" but quite often changeable and "attain their heightened ontological status by producing results, implications, surprises, connections, manipulations, explanations, applications" (Daston 2000:10). They are for all practical purposes not only scientific objects but also social objects, produced in indiscriminate acts of synthesis out of a society's epistemological, esthetic, and instrumental strivings. All this is quite consistent with the standpoint of co-production represented in this volume, but Daston's commitment in the end is to the *history* of science's objects of study; neither power nor culture is explicitly an issue in her account, although the categories of state and society figure in the contributions of some authors". (Jasanoff, 2004, p.)

[33] "The making of science is also *political*, we argue; indeed a central claim of our collection is that there cannot be a proper history of scientific things independent of power and culture. Pursuing this line of thought, some S&TS scholars see co-production as a process that is as foundational as constitution-making or state-making in political theory, because it responds to people's deepest metaphysical concerns. It does so, in part, by continually reinscribing the boundary between the social and the natural, the world created by us and the world we imagine to exist beyond our control. "Science" and "politics" can then be treated as separate and distinct forms of activity rather than as strands of a single, tightly woven, cultural enterprise through which human beings seek to make sense of their condition. Others working in a co-productionist vein are less concerned with metaphysics and more interested in the practical accommodation of new knowledge within existing forms of life. For them, there is nothing inherently problematic about seeing the world as organized, at any given moment, into clearly demarcated domains of "science" and "politics." Ideas and objects are simply obliged to undergo a kind of parallel processing in order for problems to be solved in either domain: that is, nothing significant happens in science without concurrent adjustments in society, politics or culture; similarly, intransigent social problems seldom yield to resolution without changes in existing structures of knowledge. Fitting technology into this picture makes for further quandaries, since humanity's material productions affect both what we know and how we behave". (Jasanoff, 2004, p.)

[34] "S&TS scholars have differed importantly in how they view the role of the material and the inanimate in constituting social order, and the degree of agency that they are prepared to grant to non-humans (Hacking 1999; Latour 1996; Collins and Yearley 1992; Callon and Latour 1992). (…) there is no univocal position on these matters in current work in the co-productionist idiom. Instead, the authors show from varied perspectives that the co-productionist idiom can shed light on the constitution of varied social orders, such as international regimes, imperial or comparative politics, science and democracy, and the boundary between public and private property; equally, this approach can illuminate situated interactions between scientific and other forms of life, in settings ranging from laboratory conversations and patients' discourses to the courtroom. Similarly, the co-productionist approach can address the formation of widely varied elements of natural order: for example, climate change, human intelligence, endangered species or sugar cane propagation" (Jasanoff, 2004, p.)

[35] Jasanoff argues (2004) that the fact that, since scientific knowledge increasing start being seen as constituted by social practices (Merton, 1973; Collins 1985; Latour and Woolgar 1979; Bloor 1976; Kuhn 1962), and considering as the main fruit of STS works the reinforcement of the idea that scientific knowledge is socially constructed, seems to

processes through which, ultimately, "*the realities of human experience emerge as the joint achievements of scientific, technical, and social enterprise: science and society, in a word, are co-produced, each underwriting the other's existence*".

Considering the particular salience of the categories of nature and culture and the peculiar materialization and manifestation of the processes of hybridization in the GMOs controversy, the co-production idiom expresses the attempt to explore a 'language for hybrids': the hybrids which ironically emerge by those rhetorical exercise of power through which, by scientific division between nature and culture, the ordering of knowledge societies occurs. The co-production idiom seeks, rather, to develop a 'different' language – the language for co-produced hybrids – than that which dominates in those interpretive and operative models of disciplinary division of modernity.

Considering this perspective, what are the main emblematic hybrids of current knowledge societies, and what are the symbolic processes through which the hybridization of coproduced social orders is made more visible? And how the proliferation of hybrids in current late modern societies can be seen as a signs of the crisis of modern societies (Latour, 1995), and, in this sense, as an element of the processes of reflexive modernization, also addressed by Beck?

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produce "*two irresolvable problems, one theoretical and the other pragmatic*". The theoretical problem concerns with the fact that from this perspective it is easy to fall in simplistic social determinism, for which, following the idea of not conferring any 'supremacy' to technoscientific knowledge as something set apart from society, it could be as conferring a sort of primacy upon the "social", which can imply the risk of denying the work of co-productivist works. As Jasanoff describes the constructivism (Knorr-Cetina 1999; Collins 1998; Pickering 1995; Woolgar 1988), framing these approaches among the relational co-productivists perspective, in this stream is not implied that social reality is ontologically antecedent to natural reality, or that the set of social factors are what determine the workings of nature; rather the definition of "social construction" deals the investigation towards a de-constructivist approach toward any form of naturalization of technoscience, rigidly fixed apart from society. The second practical problem emerges by the idea that social construction "tends to inhibit the symmetrical probing of the constitutive elements of both society and science that forms the essence of the S&TS research agenda". One or another aspect of the "social" – be it "interests," "capital," "gender," "state" or "the market" – risks being black-boxed, treated as fundamental, granted agency, and so exempted from further analysis. The suspicion that social constructivists are arrogating to themselves an Archimedean point from which to deconstruct science has provoked criticism of S&TS as insufficiently reflexive (Woolgar 1988). It is also this reductionist reading of the "social" that has allowed defenders of the transcendental nature of science to rail at the idea of science as a social construct; in the so-called science wars of the 1990s, attackers of science studies frequently charged the field with misrepresenting scientific knowledge as "merely" social or political (Sokal and Bricmont 1998; Koertge 1998; Gross and Levitt 1994). Of course, no adequately social representation of science could ever be dismissed with the label "merely."

GM products, frozen embryos, the AIDS virus, the ozone hole, the development of internet and many others “objects” like these, deal at the core of this question of ordering society through the ordination of knowledge, through the cultural processes of naturalisation of the distinctions between natural and cultural products. These cases make visible the obscuration of some processes of the co-production of power-knowledge, partly because they represent immediate symbols and materials of the dynamics of hybridization between natural, human, scientific, social, artificial elements and factors: they are co-produced materials.

Thus, through the focus on the processes of hybridization and on the reproduction of the categories of nature and social, in the GMOs controversy the coproduction’s idiom shows how these divisions of modern ‘tradition’ can no longer give an account of the proliferation of ‘hybrids’, and how these lasts, as co-produced material, undermining at the foundation the principles and model of modern social structures in their relationships which agents: (they) manifest the crisis of current late-modern societies because ultimately hybrids can be represented reflexively as the materialization of the impossibility of separation of modernity as the principle of stability of social order, but rather they ‘testify’ every day under our eyes the opposite. Hybrids constitute reflexive *f-actors* of modernization, because they make visible the limits of model of development and progress of modernity based on this scientific principle of functional division. In this perspective, even the modern state can be seen as a hybrid: the division of the constitutional powers – judiciary, legislative and executive – within the modern state represents a fictitious exercise of a form of hybrid power which rather governs through all these branches, as in a network of relationships, operating through the agency to make division between cultural and natural facts, and through the agency to naturalise these divisions which compose the boundaries and protections of modernity.

In this regard, following Jasanoff's account on Bruno Latour's work[36] about the proliferation of hybrids and the crisis of modernity, *de facto* modern society has never worked in a coherent manner with the principles which guide it. Its system of representation of the world, which radically opposes nature to culture, is rhetorically in contradiction with the fact that those so called modern societies are so far reproduced themselves by reproducing hybrids, emerging through the division between nature and culture on which the modern ordering of societies is based. *We have never been* really *modern*, then, if we look reflexively at the paradigm of rational, scientific, disciplinary division of modernity through the lenses of coproduction's idiom, which focus the attention on the processes of hybridisation as a sign of the impossibility to keep divided what has been constitutively founded as a social and technoscientific enterprise – the modern world. Nevertheless emphasising the ambivalence of modernity, the bases of modern world have been supported by the enlightenment and modernist idea of human capability, through the scientific ordering of knowledge and society, of discerning natural and true facts from all the rest that can obscure the development of humanity, by the obscuration of scientific truth.

[36] In her reconstruction about the idiom of co-production within the field of STS, Jasanoff takes into account several approaches and very exhaustively the different directions that are explored in this debate, and how the different co-productionist perspectives explore these various trajectories. In this dissertation, considering the case study about the regulation of GMOs, and particularly the idea for which GMOs are conceived, in this work and in the literature, as hybrids products, the connection between the co-production idiom of Jasanoff and the deconstructionist approach to modernity of Bruno Latour, with particular regard to his work, we have never been modern (1995), where he explore the crisis of modernity as the result of the explosion of hybrids, at this stage of the dynamics of modernization, as the signs of the impossibility to consider modern our society, if for us modern orders are conceived as systems which are established on the basis of the principle of scientific division between, ultimately, nature and culture through which separation, in the reproduction of facts, artifacts, systems, social realities, modern worlds are supposed to be governed. If this principle of division is what characterizes as modern a social order, Latour argues we have never been modern, because modernity, in the totalizing reframing of social orders through this principle, is established rather on the proliferation of hybrids which are the results of these cultural divisions between nature and culture. Thus, it means from Latour's perspective that the crisis emerges when the fact that even and above all the division between cultural and natural facts, in which dynamics of affirmation of the division technoscientific knowledge covers the main role, is a cultural process. With the explosion of the world of hybrids, in the increasing impossibility of keeping apart nature from culture and cultural element from natural aspect of social life's reproduction, in the ordering of society through the ordering of knowledge, the crisis of modernity is represented as the revelation of the fact that the model which support the idea of modern society, the division between scientific and natural facts and cultural facts is fictitious, rather it emerge the intricate relationships between all the field of social actions, and thus in this sense hybrids reflexively delegitimate the structures of power and the – scientific, political – authorities constructed on the basis of their independency and autonomy each other. This perspective is very meaningful in order to explain the dynamics of crisis in the regulation of GMOs, where these products, as hybrids and coproduced imaginary, innovation, regulation, are tried to be managed essentially as a scientific matter, and the policies, across national European states, are tried to be legitimated on the basis of scientific grounds, but their connotation of reflexive hybrids tends to disclose several paths of critical and controversial social conflicts, particularly between structures and agents.

Thus, the science making, also as socio-political activity, is reproduced through the internalization-naturalisation by both the members of scientific community, and 'lay' citizens, of the partial or total externality from social factors of scientific authorities, and generally of modern-rationalised authorities. The obscured point that I want to underline through the co-production idiom, and particularly through its use of the concept of hybridisation, is that the basis of legitimation of these modern authorities are placed on the fictitious idea of the separation and independency of the science making from the policy and politics making, in the structure of power of modern states. And through the proliferation of the world of hybrids the stability of the boundaries and divisions of modernity are challenged, as well as the basis of legitimation of the modern authorities which are founded on these divisions: it is as if 'the king was naked'.

Thus, the crisis, contradictions and tensions of modernity are also related to the dimension of responsibility of public decisions and actions. Particularly, considering the relationships between scientific and political authorities and citizens, in these coproduced states of knowledge, even if the structures of power and the fields of social ordering are sustained and legitimated as independent, autonomies each other, it is increasing impossible to attribute responsibility and accountability for the consequences and implications of the processes of progresses and development through which currently social changes and, at the same time, the maintenance of social order are reproduced.

> What happens in science and technology today is interwoven with issues of meaning, values, and power in ways that demand sustained critical inquiry. Consider, for example, the transformation of a sheep named Dolly, born of a virgin mother in an obscure laboratory near Edinburgh, Scotland, into a universally recognized symbol – of progress for some and moral transgression for others. Cloning was hardly the kind of event that could be counted on to set in motion the machinery of high politics. The scientific claims of the Edinburgh researchers had not been tested or replicated when they captured headlines round the world (…). Dolly was a product of biomedical, not military, science. Her materialization posed no immediate threat to people's livelihood or security. Yet, presidents and prime ministers reacted in haste to the news of Dolly's cloning, recognizing as if by some inarticulate sixth sense that this was an event for which politicians as well as scientists would be held accountable. (Jasanoff:2004, p. 29)

From the perspective of this dissertation, GMOs issues can be considered in the same universe of hybrids where Dolly ship comes from and is prefigured by Jasanoff, with the addition of an

immediate imaginary of a particular reflexive dimension of risk and hazard on people and environment which is implied in GM products and characterize immediately the GMOs controversy as a technoscientific risk controversy. The ineludible element of reflexivity, which emerge inevitably in these very emblematic examples of hybridization and coproduction of sociotechnoscientific enterprises and sociotechnical imaginaries of modernity, is expressed by the (partial) recognition, as Jasanoff argues, by power institutions and agents, of the fact that these sort of dynamics of 'development' and 'progress' carry out several questions of political and scientific accountability. These processes of change and innovation, for the very high social impact which imply, arise as questions of public security and are compressed on this dimension. In the complicated interactions between technoscientific meanings, public attitudes and political and economic commitments, and through the increasingly enforcement of scientific division and emergency strategies, by these controversies it is established a form of governance of risk as a sort of machine of "organized irresponsibility" (Beck in Jasanoff, 2004).

> (…) Such complicated choreography is not uniquely associated with the life sciences. In little more than a decade, a formless entity called the Internet, whose organization and governance remain a mystery to most of its users, became a player in countless contemporary social transactions. In exploring its possibilities, millions of people began to alter not only the architecture of the Internet but also, in diverse ways, their own preconceptions of what it means to belong to social units such as the family, community, workplace, firm or nation. The sum of their interactions has changed the nature of commerce and capital, producing integration and disruption on global scales. (…) In the computer age, it is increasingly difficult to pin down with certainty the places where politically salient events originate, let alone to determine who controls the levers of power. Similar fragmentation and dispersal of authority have also been noted by sociologists of risk. Not without cause has the German sociologist Ulrich Beck (1998) called the politics of risk "a form of organized irresponsibility" (see also Beck 1991). (*Ibidem*)

With particular regard, in this dissertation, to this kind of processes of regulation of risk, this "organized irresponsibility" seems to emerge within forms of invisibilised power, fragmented and dispersal in dense and tangled relationships, from a global to a local dimensions of development, and chains of structures, agents, subjects, objects, systems, apparatuses, dispositives which compose the complex dynamics of reproduction of authorities of late modern societies. In this framework, the

impossibility to find a specific place and determined subjects and structures of power to which attribute the course of actions in risk regulation is expressed by the fact that the division and independency on which is supposed to be sustained the modern social order does not find any correspondence with the effective tangle of interrelations through which the order is rather constituted.

In scientific reorganization of irresponsibility, in risk issues, one constitutive elements of crisis, then, is expressed by the impossibility to identify power and attribute responsibility for the world of hybrids which emerge by the intensification of the processes of modernization. Here the crisis of the system comes; the model of scientific division of modern social order shows reflexively the impossibility of its realization, its limits and critical points.

In this sense, in risk issues it is possible to highlight how technoscientific agents act as political agents and social authorities in the definition and development of policy and decision, and governmental institutions act in a continuous delegation of their agency to technoscience, in the name of emergency and necessity of scientific assessment and management. In this kind of controversies, from a theoretical point of view, the connection between the idiom of co-production and the processes of hybridization represents a very important theoretical *trait d'union* in the study of knowledge and power in current crisis of modernity. Focusing on the hybrids as signs of coproduction processes, Jasanoff introduces one of the central concepts, in STS debate, on which several varieties of co-productionist analyses are stimulated.

Considering the stronger recognition of the fact that 'nature' is a social and cultural product as one of the most important results of these co-productionist approaches, in their attempt to overcome the division between natural and cultural facts, co-production is aimed to develop an approach of sociological analysis where there is the "*self-conscious desire to avoid both social and technoscientific determinism in S&TS accounts of the world*". In this goal, the idea of hybridization, with that of situatedness of knowledge and reflexivity, is at the basis of the idiom of co-production,

and its narration, rather than emphasising one or other side of determinism or determinist f-actor of reproduction of social order, shows how this division between nature and culture is a cultural and particularly a western creation. This perspective highlights those mechanisms through which western societies face the multitudes of hybrid networks that populate their cognitive and material experiences, reframing the complexity of their constitutive relationships through the idea of reproducible autonomous and independent sphere divided between nature and culture. In Latour's perspective there is an idea of de-construction of this constitutive duality of modern world, through the recognition of the belief of modern societies in the possibility to reproduce social order on the basis of this scientific division, and by it, on the controllable of nature and culture.

> An appealing aspect of this view is that it genuinely is about *co*-production – that is, it does not presuppose any *a priori* demarcations of the world before that world is worked upon by human imagination and labor: "But Society, as we now know, is no less constructed than Nature, since it is the dual result of one single stabilization process" (1993:94). The analyst's task is to make visible the connections that co-production renders invisible, so that both "natural" objects, such as the cloned sheep Dolly or the ozone hole, and "social" objects, such as experts or governments, can be seen as linked together in *actor-networks* whose heterogeneous constituents criss-cross the constitutional divide. (…) In exposing the constructed character of the nature-culture boundary, Latour calls attention to the role of material objects as well as human institutions in assigning hybrids to one or the other of his two constitutional domains. His program grants agency to humans as well as non-humans, although mechanical agents in Latour's accounts (as contrasted, say, with biological ones like Pasteur's yeast) often seem to operate as surrogates for human actors, homunculi to whom humans have chosen to delegate some part of their own agency. Embroidering on these ideas over many years, Latour has made telling observations about the pervasive interdependence of the natural, the social, and the material: thus, "nature" is the result, not the cause, of solving social controversies (1987); the laboratory is a microcosm of larger aggregations of power (1988a); material objects and artifacts, such as door locks or speed bumps ("sleeping policemen"), incorporate and effectuate social norms (1992); big social institutions, such as capitalism or markets, are built (paralleling Barnes 1988a) by the same means that scientists use in making persuasive representations of nature (1990); and the essence of modernity lies in its dedication to "purifying" the hybrid networks of nature and culture (1993) (Jasanoff, 2004:34).

Following the junctures between Jasanoff's perspective of coproduction and Latour's analysis, and linking these interconnected approaches to the aims of this study, the processes of 'purification' of hybrids networks of nature and culture – through which particular cultural facts are replaced as natural facts that rule in power dynamics and in the reproduction of social orders – play particularly on the plane of the social representations, in which technoscientific knowledge and scientific

representations and sociotechnical imaginaries have a crucial role. From the view of this research, within the field of risk and GMOs policy regulation, the social process which tends to obscure the co-production dynamics and through which the 'purification' assumes its normative aspect and connotation can be interpreted with the idea of 'scientification' of both the 'observer' and the 'observed' – the subjects and the objects – in the reproduction of the network of biotechnology.

> Representation plays a key role in holding the networks together. Scientific representations, in particular, are products of multiple translations of form and meaning between the observer, the observed, and the means of observation across the network. (*Ibidem*)

In this sense, the questions of power and stability of social order, in the processes of innovation and social change, the maintenance of the structures and authorities, are all involved in the coproduced and hybrids chains of networks which arise through risk controversies. Thus, the social reproduction of the dominant public representations, discourses and practices is strictly linked with the resources and the dimension of the same networks of actors and themes which proliferate in the current social imaginaries of western democracies. Considering this aspect, power is never uniformly distributed within the network. Regarding particularly the relationships between the reproduction of hybrids and scientific dominant representations, power tends to be dispersed in what Latour calls "centers of calculation" (Latour 1990).

Considering the GMOs case study, these centers of calculation, which are developed mainly as technoscientific network of risk control, assessment and management, constitute the core of the processes of scientification-purification-obscuration of the dynamics of co-production of normative knowledge. Particularly through these centers – these hybrid products of the radicalization of the consequences of reflexive modernization –, and by the dominance of technoscientific instruments of government, the division and ordering of natural and cultural fact can be re-disposed. That is through: *printing presses, statistical formulas, maps, charts, and every manner of scientific "inscription device"* (Latour 1987), all tools through which dominant perceptions and imaginaries of the world are legitimated and framed as supportable and desirable paths of human development.

Thus, interpreting the processes of purification, within STS's debate, as those mechanisms by which scientific facts and representations are naturalised as natural facts, acquiring a particular form of social normativity, in this research the emphasis is on the processes of obscuration of co-production's dynamics through these centers and dispositives of scientification-naturalisation[37], and particularly on the ways through which these invisible forms of knowledge-power act in the reproduction of risk policies, within national and supranational political arenas of the GMOs decision making.

Integrating different approaches within the STS debate, the co-production model tries to extend the perspective of social study of science to the analysis of the organization of technological practices and the credibility of scientific claims and how they can vary across cultures. In this sense, the dynamics of crisis described by Latour are extended through the co-production idiom to a particular dimension of analysis which focuses on the ways in which some actor-networks remain contested and unstable for long periods while others settle quickly, and "*why work at some nodes stabilizes a network more effectively than at others; or what role memories, beliefs, values, and ideologies play in sustaining some representations of nature and the social world at the expense of others*" (Jasanoff, 2004).

In this research, these questions are very useful in order to formulate the guideline of this analysis: in what forms the hybrid and glocal networks of biotechnology are created, sustained and contrasted; what sort of beliefs, changes, values, ideologies support the development of particular biotechnological representations and socio-biotechnical imaginaries – arising through social friction

[37] Framing the crisis of modernity through the connection between the processes of coproduction and hybridization, and considering the dynamics of obscuration expressed by the scientification-naturalisation and 'purification', at the core of this perspective there is the intention of provoking the idea of isolated forms and structures of power, and evoking, rather, the networks in which the exercise of power is supported in late capitalist democracies, in their complexity and reflexivity. As Jasanoff argues, Latour's perspective on the relationships between hybrids and crisis of modernity can be extended, through the wider co-production idiom, to those researches in STS which are expressed by the focuses on the ethical, moral and political conflicts that normally accompany the creation and maintenance of the systems of scientific governance.

and public concern; and through what sort of representations of nature and social order, that involve, as Jasanoff suggests, the exclusion of other paths of innovation and social change.

Finally, the central point of this section which I underline in order to open the following part is that the co-production idiom constitutes a very meaningful characterisation of the entire STS's debate, which allows and stimulates the study of situated forms of power connected to the reflexive analysis of knowledge, technoscientific innovation, situated models of progress and development across national political cultures and according to their dominant social representations.

Patterns of co-production in the GMOs case study: instruments of co-production in the biotechnology policy

In this comparative study on the regulation of GMOs in Europe, Italy and Britain, the idiom of coproduction results particularly appropriate not just in order to show the dynamics of interconnection between the field of science, politics and society; but also because through this theoretical and methodological focus on the co-production of normative knowledge it is possible to investigate those processes that seem, rather, to obscure the same co-production, and through which the modernist idea of division between forms and structures of power and knowledge is reinforced, in the structural exigency of legitimation of the actions and decisions of public authorities.

In this sense, in this section the focus is on the relationships between the processes of co-production of normative knowledge and the dynamics of scientification of policy and politics which occur in the development of the normalization of GMOs risk in Europe. Following the scheme of reconstruction of Jasanoff's idiom, I take into account the different instruments of co-production and I connected them to the field of biotechnological regulation. Through this scheme of connections I tried to make visible the dynamics of invisibilisation of the co-production processes, particularly considering the development of GMOs policy as a science-based policy and as a risk policy, and where this asset corresponds to the necessity of political and scientific authority to gain legitimation and justification of their decisions and positions in the general context of public mistrust within which the GMOs controversy emerged in different national contexts.

Referring to both the constitutive and the interactional streams in the field of STS which take into account the reordering of nature and culture through the reordering of knowledge and power structures, Jasanoff's model of co-production represents the attempt to put together the different pieces of analysis of these theoretical contributions "*in a sufficiently programmatic form to open up a distinctive research arena for normatively-minded students of science and technology, as well as to engage in a more ambitious discourse on power and culture with the traditional social science disciplines*" (Jasanoff, 2004).

With these goals, in the idiom of coproduction the emphasis is on the dimension of contingent, on the local and temporal situated processes of reproduction of social order and knowledge, within the changes of social realities, with particular regard to the (for some aspects) tacit and the ambivalent role of science and technology and innovation in framing policies.

> S&TS research has repudiated equally the triumphalist themes of progress and emancipation associated with Enlightenment views of science and the pessimistic images of technology as disciplinarian, despot or iron cage, ruthlessly imposing its instrumental rationality on human behavior, that have informed decades of European philosophical and sociological thought (Habermas 1975; Ellul 1964). In their place, S&TS has sought to create a picture that remains profoundly humanistic, stressing the roots of science and technology in human agency and will, but denying any singular logic or design. Accordingly, S&TS has generated a wealth of detail about accommodations made by particular practitioners to specific, messy, local challenges in encounters that smack more of *bricolage* than of an idealized scientific method. Skeptical of claimed patterns and post-hoc generalizations, such work offers at first sight inhospitable material from which to weave more general doctrines connecting natural and social order. Nonetheless, (…) the attempt is distinctly worth making (Jasanoff, 2004, p. 45).

Reframing the different contributors within STS which can extend the analysis of science and technology policy through the idiom of co-production, in Jasanoff's perspective this model can be able to reconstruct resources in order to think about the processes of *sense-making* through which human beings come to determine forms of control and rule in the division of social and natural worlds, where science and technology are very often represented as fixed and naturalised schemes of human evolution and evaluation.

Rather, in the perspective of the co-production idiom, science and values, objectivity and subjectivity, and, in this sense, intersubjectivity, have to be seen as reintegrated materials which perform the experiences and lives of modern societies. Thus, in the co-production analyses the idea is to develop, contrasting the conceptualization of iper-rationality of structures and *ignorances* of lay agents, the picture of human beings and their institutions as *knowing* and reflexive agents, on the basis of different cultural frameworks in which the reproduction of sociotechnical imaginaries takes form. This perspective contrasts those views which treat these entities essentially as calculative actors which make their choices rationally and through a set of taken for granted preferences made up within the limits of own field of social actions.

On the basis of this different emphasis on the processes of modernization, in the co-production's model, the attempt is to make visible the denying of the interdependency between political, economic and social power and science, in the affirmation and opposition and contradiction of models of innovation, development and progress which characterise social orders.

In this sense, the *exigency* in STS's debate of considering and creating an idiom which can show and represent differently the reproduction of power, in the relationships between structures and agents, can mean basically the necessity to develop a different vision from that of pure scientific rationality, independency and divisions between power structures, agents and their isolation from contingents and situated cultural factors.

Considering these processes of co-production and their invisibilisation by the dynamics of scientification of policy and politics, through the purification of naturalised scientific evidences, the GMOs controversy, as Jasanoff argues (2005), is a highly representative case study through which identify the mechanisms, dispositives, structures and channels within which the co-production of normative knowledge occurs, and simultaneously how it is invisibilised by the processes of scientification-purification. First of all, in biotechnology policy the invisibilisation takes forms in the definition of this field of political regulation essentially and predominantly as a science-based

issue and as a matter of scientific risk assessment and management. The legitimation of the decisions and directions of innovation and development, in this dispositive, derives from the accreditation of technoscientific bodies as neutral and independent organisms which work in order to make sense in dispute which involve, rather, several social, political and economic problems.

In order to frame the study of GMOs policy within the conceptulisation of the co-production idiom, it can be useful to consider the reasons of the high representative of this field of technoscientific regulation. Reading the following argumentations of Jasanoff, on the different trajectories of investigation in co-productionist analyses, it is possible to consider how within the field of the GMOs policy these directions of investigation are all particularly salient in the construction of public debate and socio-technical imaginaries of biotechnological innovation.

> The co-productionist idiom has tended to cluster around four recurrent themes. These are the *emergence and stabilization* of new technoscientific objects and framings, the staple concern of constitutive co-production; and, on the interactional side, the resolution of scientific and technical *controversies*; the processes by which the products of technoscience are made *intelligible and portable* across boundaries; and the adjustment of science's *cultural practices* in response to the contexts in which science is done. In each of these areas, work in the co-productionist idiom stresses, as we have seen, the constant interplay of the cognitive, the material, the social, and the normative. Co-production, moreover, occurs along certain well documented pathways. Four are particularly salient (…): making *identities*, making *institutions*, making *discourses*, and making *representations* (Jasanoff, 2004, p. 54).

Following these four focuses through which the idiom and dynamics of co-production can be explained and can be used to explain current social changes and power exercises, I connected the analyses on these particular topics to the case of GMOs controversy; thus in the next pages I reconstructed the framework of Jasanoff's analysis on co-production following these four dimensions of investigation and I link them to the field of biotechnology innovation, in order to, at the same time, show the representative of the GMOs case study within the research's trajectories in STS's debate, and with the end to make operative the idiom of co-production in the study of one of the most 'classical' cases of STS's analyses.

Making identities, making institutions, making discourses and making representations result to be a useful interpretative scheme to *make sense* of the processes of co-production within the GMOs controversy: life science and particularly the most recent developments in the field of the technologies of manipulation of life act on all these dimensions of co-production – for the deep changes, challenges and promises which are prefigured with their 'advent'; for the fact that they concern the re-definition of forms of life and social and political identities; for the facts that they require the establishment of hybrids *technoscientificpoliticaleconomic* institutions of regulation and production; for the fact that they are constructed socially through the development of public discourses which support and/or create opposition to the evolution of these practices, reinforcing the GMOs network, and composing it in different ways in several cultural contexts; and for the strong and deep character of reflexivity in its connotation of risk which makes this field of innovation as a controversial dimension of production of social imaginaries and representations on the present and future paths of national and human development and progress.

Also, studying the operation of the mechanisms of maintaining order, in the co-production of GMOs controversy, these instruments give an account of the several dispositives through which, in different context and with various results, public decisions are taken, policy making is developed, and the normative divisions are predisposed – between those subjects who are able to make and order in the risky disorder coming from biotechnological innovation, and those subjects who are partially able to understand, on their own, these same mechanisms of innovation and scientific progress which deeply involve and are involved in social change.

In short, in the world of hybrids both the ontology of subject and power are called to modification and re-adaptation, particularly if we look at these dynamics through the case of the proliferation and commercialization of GM products.

> Each of these instruments of co-production can serve varied functions in maintaining order. They can be *morally* or *metaphysically* sustaining, in that they divide the world of hybrids and cyborgs into less ambiguous categories that can easily be dealt with in law and custom. In spite of its ambivalent

> identity, for example, the cloned sheep Dolly remained for the duration of her short life firmly encamped in the company of domestic animals, as just another product of "ordinary" animal husbandry. Despite her unique ontology as a willed, exact genetic copy of another living creature, Dolly was not treated as something wild or unnatural that resists classification – as would, for now, a cloned Bill Gates or Osama bin Laden. Scientific and technological products also do metaphysical work in preserving critical boundaries between self and other, structure and agency, state and citizen. The identities, institutions, languages, and representations created by science and technology can be *politically* sustaining, by helping societies to accommodate new knowledges and technological capabilities without tearing apart (indeed, often by reaffirming) the legitimacy of existing social arrangements. Finally, they can be *symbolically* sustaining, providing surrogate markers for the continued validity of certain familiar dispensations when uncertainties threaten to overwhelm or disrupt them; examples include, in some liberal democracies, the presumed superiority of markets over state regulation or the equally mythologized one-to-one correspondence between votes cast and voter intent (see Lynch et al. 2001) (Jasanoff, 2004, p. 59).

In the case of GMOs how does each of these four instruments of co-production operate in the reproduction of biotechnological regulation? How can they be described? How are they invisibilised through the processes of scientification of GMOs policy and public debates?

Making Identities. Within the processes of reordering life science's knowledge, reframing the idea of life, through the processes of biotechnological innovation, means reframing the connotation of political, governmental and economic treatment of these forms of life, and on several levels the governance of biotechnology policy plays a central role in the redefinition of the notions of public participation, democratic accountability, and political, social and cultural identities. The history of biotechnological innovations, as a coproduced and hybrids field of sociotechnical imaginary and paths of development, and as the possibility to create GM materials currently patentable, show how we are living in a world of hybrids where the boundaries between natural, cultural, political, scientific, economic, ethical and social facts cannot be distinguished each other. In the relationships between the social processes of production of technoscientific knowledge and innovation, considering the implication of political and social regulation and conflicts, these dynamics generate and are generated through social changes and adaptations of social and cultural identities both of social structures and agents, on an individual and collective dimension.

Following Jasanoff's perspective, the category of identity constitutes an important notion in co-productionist accounts because, in its different connotations and forms – human or non-human, individual or collective, natural or social, scientists or lay citizens, etc. – it represents one of the most potent resources with which people restore sense out of disorder.

> When the world one knows is in disarray, redefining identities is a way of putting things back into familiar places. It is no surprise then that co-productionist writing in science and technology studies, concerned as it so often is with emergent and controversial phenomena, has consistently been absorbed with questions of identity (Jasanoff, 2004, p. 61).

In this account, and connecting this framework to the GMOs case study, the disorder produced by the explosion of biotechnological hybrid products requires the redefinition of identities in order to recreate that model of division to oppose to the confusion generated by the necessity to rewrite the boundaries between the fields of natural and cultural facts, which are however very hardly distinguishable in biotechnological innovation. The dynamics of division – of making order through new classification, and formation of new levels and dimensions of identities among different subjects and types of individuals, and new forms of life – is conceived as a practice strictly connected to the role of science of producing natural facts and distinguishing them from cultural elements and opinions.

This process implies the invisibilisation of the dynamics of coproduction, through the specific mechanism of making identities involved in the GM production and regulation. First of all, there is the implication of the dimension of identity of these hybrid products which recalls the attention on questions like "what is life" and what forms of life can be manipulated? Where is the limit?

Secondly, looking at the GMOs case study through the co-production idiom, it is possible to underline the formulation of several levels of identities between different categories of subjects and objects of knowledge: for instance those planes of identities which are reproduced though the distinction between those subjectivities which have the agency and are identified as able to interpret scientific facts, and those who are not self-acknowledged about biotechnology. This distinction,

which produces particular dimensions of social identities, is normative insofar as the position (in terms of power) of these different individualities in the structure of power is determined through these distinctive identifications. In this sense, in the GMOs controversy it is possible to make visible those processes of making identities on the basis of the competence, professionalization and scientification of the forms of knowledge which rule in this field of public decision.

Through the GMOs case, the level of identity connected to the concept and status of citizen is involved: in the GMOs controversy, focusing on the social representations and public discourses which compose this case study in Europe, we can see the materialization of the consumer-citizens or citizens-consumers[38]; the increasing use of the identification of citizen as a 'lay' subject respect the (sacred) category of technicians, scientists, experts and bureaucratic figures and mechanisms.

On the another hand, as the GMOs controversy shows both in Italy and Britain, the dimension of identity of citizens-disobedient[39] is subject to transformations, re-adaptations and it is involved in this kind of conflicting controversies: in an ambivalent way, in Italy a farmer which has grown GM maize has been considered disobedient mainly by governmental institutions, as well as, for other reasons and from other perspective within the Italian biotechnology network, activists and members of NGOs which have destroyed that same GM field have been called disobedient, but at the same time, from other viewpoints, they have been seen as those social actors which have restored public order. Similarly in Britain – but through different dynamics and relationships between structures of power, and between these lasts and agents – a farmer which planted a GM field for experimental end, predisposed by the central British government, on a territory at the limits with Welsh state, has been judged disobedient by the Welsh Court of justice, because in contrast with the Welsh law which is expressed through an opposite position to GMOs on its local territories. At the same time, the activists who destroyed that GM field have been proclaimed innocents by the same Court.

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Although through different trajectories and results, if we look at the processes of co-production of normative knowledge as a dynamic of re-definition of social identities, this example shows how GM fields[40] is an open hybrid space in which scientific, political, social, economic relationships and meanings are exposed to change and their redefinition. Thus, on the basis of the GMOs case study, focusing on these dynamics, it is possible to generalize how in coproduction's dynamics the reproduction of identity is always involved: defining GMOs issues and fields of public debates, we are redefining tacitly or explicitly identity boundaries which produces the effect to confer particular forms of agency attributed differently according to the identity systems of belonging: expert, citizen, politicians, scientists, economic subjects, governmental and nongovernmental structures and institutions… (Rabeharisoa and Callon, Lynch, Carson, Dear, Dennis). These processes, as the GMOs controversy shows, are reproduced within different national contexts in which dynamics of public mistrust and social conflicts emerge as challenges and oppositions to the development of the biotechnological model of innovation.

In the unfolding of these oppositions and reflexive public-confrontations with the limits of the modern structures of power, in the governance of risk and uncertainty, identities are contrasted and challenged; for example, in the GMOs controversy identities of scientific and governmental authorities are called to renegotiate publicly their power challenged by the impossibility to be considered as forms of 'neutral' authority from the political, economic and social context.

Scientific meanings contribute to frame political and social identities, and at the same time situated and particular identities and processes of attribution of identity perform the reproduction of such scientific meanings and representations.

> But collective identities are also contested or under negotiation in the working out of scientific and technological orders. What does it mean to be "European" (Waterton and Wynne, 2004), "African" (Thompson, 2004), "intelligent" (Carson, 2004) or a member of a research community, learned profession or disease group? And what roles do knowledge and its production

[40] In the Italian version… (Bron pezzo)…

play in shaping and sustaining these social roles or in giving them power and meaning?

The cultural (food) identity of Italy is reinforced and charaterised through the affirmation of the idea of zero tolerance to GMOs; this political decision is, on the one hand, the result of the typical Italian agro-industrial and food culture, where the quality and the controlled-origin of its products represents the central immaterial characteristic of this cultural systems. On the other hand, the representation of zero tolerance to GMOs contributes to reinforce this Italian identity dimension.

Beyond this particular plane of co-produced identity, through the GMOs case study there are numerous dynamics which involve several types of identities and diverse subjects and objects. In fact, through the GMOs case study the dynamics of reframing identities can be explored in different directions: *a)* considering the processes of redefinition of forms of life, in the ordering of biotechnological knowledge and innovation and in the possibility of genetic manipulation of living materials, in which are involved juridical, political, scientific, economic practices of identification and modification of the idea of life and, in the negotiation and adaptation of these hybrids products to the systems of contemporary capitalist democracies; *b)* particularly for their connotation of risk issues, and for the uncertainty about the implications which can occur by the diffusion of GMOs into the environment, this deep dynamics of transformation of life, reformulating the concepts of risk, innovation, ignorance, is involved in a processes of restructuring of public – individual and collective – identities, for example in the attribution of particular forms of subjects and capability of understanding, assessing and managing of risk (through the current tendency to attribute this character predominantly or exclusively to scientific f-actors, which seems to correspond to the attribution of a connotation or form of ignorance in lay citizens); *c)* in the reformulation and adaptation of the systems to the processes of hybridization of biotechnology, which are reproduced by different and situated controversies around the public arenas in Europe and in the world, this dimension of social conflict and friction, the diffusion of public mistrust and detachment of citizens to the policy of scientific, political, economic institutions of biotechnological governance, trigger a

multitude of authorities' responses, on the basis of the situated relationships between agents and institutions. This aspect deals changes and reformulation of the identities of authoritative structures and institutions of power in the general reframing of knowledge societies.

Making Institutions. Considering the GMOs case study, institutions and their creation and reproduction, in co-productionist accounts, represent probably the most visible dynamics of both the processes of scientification and rationalization of risk policy, and obscuration of co-production of normative knowledge. In the case of the GMOs regulation, this dimension of "making institutions" is very well shown in the expression of the necessity, by governmental authorities, to reproduce and/or create ex novo – or reframing other bodies, in this account, of technoscientific advice – different 'technoscientific machines' of risk assessment and management embedded within power structures and governmental framework. In this necessity it is possible to read the deep idea of reliance between science and political decisions, in the construction of modern rationalized and scientific models of development. Nevertheless, this dependency seems to be obscured at the level of dynamics of legitimation of power and public decisions: considering the GMOs policy as legitimated predominantly on the basis of scientific evidences and on the independency of the authorities which produced these, the intricate relationships between science and governmental structures and their reciprocal affirmation appear to be neglected and obscured by the same idea of autonomy between these spheres.

In this research, considering the elements of comparison between the Italian and British case, this point allows to sustain that even in the case of conflicting relationships between scientific and political institutions and subjects – as in the Italian GMOs controversy – there is a reciprocal relationships, in public sphere, between the processes of legitimation and credibility of science, scientific authorities and scientific evidences and governmental actions in late modern democracies. Through this focus on the dynamics of constitution and attribution of competences and power to particular kind of institutions, the aim is to underline the dimension of profound *reliance* between

the reproduction of the authority and credibility of technoscientific institutions, the affirmation of technoscientific innovation, and the governmental structures of power and political decisions. In the ways in which this kind of social relationships have been developed in modern state and structures of power, it is possible to retrace an underlying and constitutive form of *alliance* between public authorities: it consists of their reciprocal legitimation which is paradoxically found in the claim of their independent, autonomous, rational and neutral position. As it is shown in the GMOs case study, the formation of these institutions represent an instrument of co-production of centers of control and public decision, taking however the feature of technical-scientific organism of neutral assessment, control and management of risk issues. Nevertheless in the establishment of these institutions and in their activities both governmental and scientific authorities are involved particularly in the negotiation and construction of social consensus and public order, in the common and normative attempt to make convergent the several meanings and very often controversial and conflicting positions which emerge in the dynamics of biotechnology regulation.

As stable repositories of authority and internal and external normative agency, institutions are typical social instruments for ordering things in their places at times of uncertainty and disorder. In this sense, we can observe simultaneously the co-production processes and its invisibilisation, through the GMOs case, because in the assumption of the independency of scientific authorities and institutions it is neglected the co-production processes and the hybridization between different agents and structures involved in these dynamics.

> They may be regarded in this sense as society's *inscription devices* (see Latour 1987; Latour and Woolgar 1979) – vehicles through which the validity of new knowledge can be accredited, the safety of new technological systems acknowledged, and accepted rules of behavior written into the as yet unordered domains that have become accessible through knowledge-making. As Mary Douglas (1986) wrote in *How Institutions Think*, successful institutions classify, confer identity, act as repositories of memory and forgetting, and make life and death decisions for society. Institutionalized ways of knowing things are continually reproduced in new contexts (Jasanoff 2001), either because they are socialized into actors and therefore unquestioningly reenacted, or because it would be too disruptive to reexamine them openly. For example, in market capitalism, the human subject is imagined as being able to form autonomous preferences, process information, make rational choices, and act freely upon the choices so made;

> the human subject's failure to behave as predicted is usually attributed to the market's failings (for example, barriers to information) and not to deficiencies in the underlying model of individual agency. As we have seen, such tacit models of human agency, and consequently of human nature, frequently underpin the technical discourses through which public institutions carry out their regulatory activities (Scott 1998; Irwin and Wynne 1996).

Institutions are interpreted also as sites for testing and for the reaffirmation of political culture. Through institutions, as for example legal systems and research laboratories, societies reproduces the schemes of what they fix as true assumption of problem-solving, including preferred forms of expertise, processes of inquiry, methods of securing credibility, and mechanisms of control and management of dissent.

> Solidified in the form of administrative routines, these repertoires offer constant fall-back positions from which responses to novel problems can be constructed. (…) co-production could hardly be conceived in the absence of institutions, partaking of their resilience as well as their plasticity. When environmental knowledge changes, for example, new institutions emerge to provide the web of social and normative understandings within which new characterizations of nature – whether climate change, endangered elephants or agricultural science (Miller, Thompson, Storey) – can be recognized and given political effect. In other policy settings, institutions are required to interpret evidence, make law, standardize methods, disseminate knowledge or ratify new identities. Treating these functions as integral to the work f institutions offers an obvious point of contact between co-productionist work in science and technology studies and new institutionalist approaches in sociology and political theory.

Through the GMOs case study the focus is particularly on those technoscientific, governmental and supranational institutions, like the European Food Safety Authority, which are placed, in the reproduction of power and order, as necessary and as the answer to the necessities and emergencies of contemporary democracies: in risk controversies decisional power is, mostly, delegated to this kind of scientific authorities which are constituted, as autonomous and independently from political, economic and social commitments, in order to asses, ultimately, the connotation of risks, potential crisis, and the various implications deriving by the development of GM products. The example of the EFSA in Europe, within the GMOs case, highlights this dimension of the processes of co-production of normative knowledge which occurs through the construction of specific institutions and committees which assume the role of public authority and social arbiter, and through which public decisions are legitimated. EFSA is claimed to be composed in order to ensure scientifically

that European food can be considered safe, but in fact they are predisposed to act as political agents that have predominantly the power to normalise risks and to produce certainty from disorder in the processes of the GMOs regulation.

In short, this means that making institutions corresponds to make laws, standardizations and decisions. Specifically in the GMOs controversy, it means to affirm, through the establishment of technoscientific institutions, the model of good and sound science versus bad and weak science as the principle through which to govern reality, social changes and public frictions. In this shift, through the affirmation of the methods of risk assessment and governance, the establishment of these scientific bodies and the authorities is connectable with the reframing of particular forms of knowledges and identities, in their social changes and modifications.

Considering this dimension of institutions making, in the GMOs case the obscuration of coproduction occurs through dynamics of purification and naturalization of scientific facts as evidences and truths, particularly within specific and reified technoscientific institutions, at the national and supranational level, as the case of EFSA in the GMOs risk management. As risk represents the predominant issue and node in the more complex and extensive dynamics of the GMOs regulation, the scientific management of risk is identified as at the core of the definition, organization and normative articulation of this policy and public controversy. Thus the processes of institutions making is strongly concentrated on this scope, producing the effect to dissolve power among these co-produced institutions-centers of risk control.

Making Discourses. In this account on the instruments of co-production, the dimension of the definition of social problems and the ways through which these becomes more relevant than others in public sphere, and through what kind of discursive framework and network result to be central.

In this account, taking the case of GMOs, this can be considered as an issue presented mainly as a question of *problem solving*, and this produces the unfolding of particular forms of power and

several types of relationships between science, politics and citizens. In these situations at the core of the same interconnections between these different subjects (and objects of knowledge-power) prevails a perspective from which the focus is mainly on the solution, rather than on the 'problems'. This deals public debates and discourses to be concentrated on the obsession and necessity to find solutions for certain types of public struggles. These lasts, particularly for this 'obsessive' focus on the dimensions of solutions, are treated as if the same problems are taken for granted, as these are naturalised (for example as GMOs are necessarily a human – thus natural? – challenge to face). In this form of social relationships concentrated on the translation of public issues essentially into questions of problem solving, I see an obscuration of the reflexivity deriving from the problems, consequences, implications which the radicalization of the processes of modernisation involves. In the case of the GMOs this seems to be the expression of a structural limit to a fuller recognition of the reflexivity implied in the development of biotechnology, which goes beyond the question of risk in the GMOs controversy. Rather, through the discursive paradigm of risk, the 'problem' (of reflexivity) is condensed and taken for granted through the scientific predisposition of the instruments of technical risk assessment and management, and thus the 'problem' is translated into a solution to find scientifically. Nevertheless, most of the reasons for which GMOs constitute and are reproduced as a public controversy result to be obscured, alienated and treated as these are not relevant, but that in terms of solutions to find. Rather, beyond the discursive domain of risk-problem solving, GMOs debates can open conflicting tensions and questions of diverse 'nature', as problems of political and scientific accountability and responsibility; issues about the dominance of big multinational enterprises which undermine the bases of legitimation and independency of the modern state as well as those of scientific authority. Still, interrogatives about the constitutive role of science as political agent and on the constitutional consequences and implications of technical and scientific governance and government particularly in the case of critical and uncertain public questions.

Furthermore, the definition of the GMOs policy and public debate, according to different cultural contexts and civic epistemologies, very often, produce the formation of new languages, and modifications of previous schemes of discourse and linguistic structures. As I summarized so far, the GMOs regulation and its public problematisation demand the formation of a language for this kind of GM hybrids. In the dynamics of social change through biotechnological innovation, by the emergency of this field of human activities of life's manipulation, in order to find words for these novel phenomena, modern structures and agents are involved in a simultaneous process of reframing the semantic fields of their forms of communication, and adapting the dominant discourses, particularly concerning the models of development and progress, to the dynamics of innovation and social changes which challenge the institutions of power. The GMOs controversy involves the production of discourses relating to the necessity of giving public accounts of technoscientific experiments, in a public sphere of skeptical audiences conceived as subjects to persuade in the affirmation, in any direction, of the network of 'biotechnological' actors. In the co-production of dominant discourses which support different – but with common conjunctures – trajectories of biotechnological development it is possible to follow the variegate strategies and ways – of institutions, media, public opinion, scientific, political and economic subjects – of framing these processes of deep transformation of the connotation, reproduction and definition of life. In this sense, "making discourse" consists in those processes through which identities and institutions find their legitimation, and social imaginaries and representation find a linguistic – and normative, in political, governmental, scientific documents – expression.

> Such strategies often involve the appropriation of existing discourses (legal, medical, and ethical languages, for example) and their selective retailoring to suit new needs. In the process, scientific language often takes on board the tacit models of nature, society, culture or humanity that are current at any time within a given social order. As Rabeharisoa and Callon and Lynch most explicitly illustrate, (…) social discourses such as law or the speech of patients may similarly incorporate and reinforce tacit understandings of science. Discursive choices also form an important element in most institutional efforts to shore up new structures of scientific authority. Thus, international environmental organizations, such as the European Environment Agency (Waterton and Wynne) or the Intergovernmental Panel on Climate Change (Miller), had to develop persuasive ways of speaking about the problems over which they exercised jurisdiction. Such efforts inevitably

> entail standardization, which may bring its own dilemmas of oversimplification and vulnerability to deconstruction in encounters between experts and skeptics (Carson, this volume; Jasanoff and Wynne 1998; Jasanoff 1992, 1986). While institutional discourses often tacitly merge normative and technical repertoires, as in many economic models, they may also enable reasoned action by defining the boundary between the promising ("natural" or "safe") and the fearsome ("unnatural" or "unsafe") aspects of nature and technology. (Jasanoff, 2004, p.47)

Making Representations: as Jasanoff argues, the category of social representation is at the core of the investigation of the social 'nature' of the structures of technoscientific knowledge, since the earliest aims, in STS, to understand the character of normativity of the relationships between the ordering of knowledge and the ordering of society. Considering the GMOs case study, the co-production idiom suggests how these ordering processes are produced through the connection between the dominant scientific discourses and representations of realities and their relationships with public: through the formation of biotechnological representations and sociotechnical imaginaries political trajectories, decisions and acts are supported, normative dispositions are involved, in the general dynamics of development of such technoscientific networks.

> The theme of representation in science studies, making its political implications more explicit. We may note in this context three aspects of representation that have begun to receive attention from scholars working in the co-productionist idiom (…): historical, political, and cultural influences on representational practices in science; models of human agency and behavior that inform representation, especially in the human and biological sciences; and the uptake of scientific representations by other social actors. (Jasanoff, 2004, p. 50)

Following this focus on scientific representations, particularly in risk issues, and considering the domain of technoscience in the reproduction of social meanings which are involved in the affirmation of these dominant social representations, the co-production's idiom has to be seen as an interpretative instrument which allows to make connections between "*natural and social orders that disciplinary conventions often seek to obliterate, thereby doing injustice to the complexity as well as strangeness of human experience*".

In other words, the obliteration of the dynamics of coproduction through the scientification-naturalization of conventions, norms, values and models coincides with its obscuration, and it deals

to consider both singular and situated dimensions and levels of supranational, national and local production of theses normative representations.

> How do new sociotechnical objects – such as climate change or endangered species, or for that matter Europe, Africa or democracy – swim into our ken, achieving cognitive as well as moral and political standing? How is knowledge taken up in societies, and how does it affect people's collective and individual identities, permitting some to be experts, others to be research subjects, and still others to be resisters or revolutionaries? By making visible such questions, and proposing answers that were not previously on the table, co-productionist analysis performs a neglected critical function. More conventionally, though no less importantly, it enables normative analysis by following power into places where current social theory seldom thinks to look for it: for example, in genes, climate models, research methods, cross examinations, accounting systems or the composition and practices of expert bodies. Prediction is the hardest case, and one may well wonder why in our surprise-prone societies any social science ever purports to tell the future. But to the extent that co-production makes apparent deep cultural regularities, to the extent that it explains the contingency or durability of particular socio-technical formations, it also allows us to imagine the pathways by which change could conceivably occur. It illuminates, in this way, new possibilities for human development (Jasanoff, 2004, p.56).

Through this account, concerning to the GMOs case study and the centrality of risk issues in the public treatment of this controversy, scientific predictions – interpreted as social exercise of imagination on specific future situations of risk – perform sociotechnical imaginaries and representations of present and future paths of development and human progress. This also makes scientific subject as political actors in the co-production processes of social orders.

Regarding biotechnological policy, the scientific rationality of divisions between science and social, political, economic spheres of social action works to legitimate the decisions of governments, in the reinforcement and diffusion of the necessity of a scientific system of governance of risk concentrated on the scientific role of prediction of natural and human phenomena. If this sustains and justifies the technoscientific asset of current democratic governments, it also puts in crisis the same structures of power and authorities because of the mistrust of public opinion, the unsustainability of the model of development and progress, in the social uncertainty within which are reproduced, in terms of imaginary and supranational and national practices of regulation.

Ultimately, in this sense, in this work the idiom of co-production is used in order to consider the very plastic and numerous variety of adjustments through which knowledges and social orders are

singularly and reflexively confused, "*and are infused by, other ways of knowing, perceiving, and making accommodations with the world*". In the reproduction of the 'laws' of nature and society, through the naturalization-scientification of this division, the idiom of co-production "*offers instead a new way of exploring the waters of human history, where politics, knowledge and invention are continually in flux*." (Jasanoff 2004, p. 57)

The state of exception as the paradigm of government of risk controversies: democracy, scientific despotism and risk in the crisis of modernity

In the light of the arguments addressed so far, the questions which I try to present in the next pages are: what forms of governance and government are developed in the intersections between the global and national management of risks, crises and emergencies of the current phase of modernity? Considering the GMOs policy, as it has been institutionalised within the European boundaries in the last decades, that is as a risk policy and an issue related to potential environmental and food crises and emergencies and, at the same time, as a necessary development for the economic, geopolitical, technoscientific and social progress of countries and populations, how can we describe the forms of the government and governance of these hybrid innovations which challenge and put in a complex relationships science, politicians, and citizens in the development of biotechnological innovation?

I shall suggest in this part that the forms of (national) government and (transnational) governance which emerge, in their connotation of scientific assessment and management of biotechnology risk, is expressed by the constitution of 'states of emergency and necessity', scientifically supported, as the normal course of power exercise and as that paradigm through which (potential or effective) crises and risks of reflexive modernization are tried to be faced by public institutions and power structures. From this viewpoint, the paradigm of the state of exception, in the light of the work of Agamben (2004), being based on the concepts of "emergency" and "necessity", is conceived in this dissertation as the basis of justification for the establishment and reinforcement of scientific domain

in politics and policy, and as part of the ‘normal’ constitutional processes through which political decisions and policies are legitimated, particularly in risk and uncertain fields of public interest.

Especially in these scopes, through a jointly reflection on the processes of scientification of policy and the formation of states of necessity and emergency through which risk and crises are tried to be managed by current international and national governments, it is possible to underline, as main constitutional consequences on the democratic systems of power, the restriction of public participation to these processes of decision making, occurring by the alienation of extra-scientific rationalities to the principal agendas and arenas of policy making.

Furthermore, following Agamben’s perspective on the dynamics of normalisation of the state of exception and emergency within the juridico-political management and governance of current crises, and thus in its normalization in modern democracies, the state of exception emerges – very often invisibly – in the intersections and confusion between scientific, political and juridical sphere of regulation. In this sense I considered this approach strictly connected to the constitutional and entangled relationships between science, politics and law underlined through the co-production idiom (Jasanoff 2004). The focus is particularly on those forms of normative knowledge which rule in “the absence of order” (Agamben 2004), and in those circumstances in which necessity and emergency become the rule of law. In this constitutional shift, which is also reflected through the imaginaries of risk society (Beck 1986), if emergency, risk and necessity matters are, first of all, in the discourse and practice of the current knowledge societies, conceived as “scientific issues” (Doubleday, Wynne, in Jasanoff 2011), from the perspective of this research, the state of exception takes the form of a despotic and scientist domain of scientific rationality in policy and politics in the current governmental management of crises.

Through these first elements, I shall argue that the paradigm of the state of exception, as Agamben (2004) frames it, can be considered as an useful analytic instrument in order to understand the constitutional basis of justification of the dynamics of scientification of risk policy and politics,

with particular regard to the field of biotechnology, in the general crisis of modern democratic institutions of power; and, at the same time, with the end to explore the constitutional implications of this suspension of the rule of law on the democratic participation of citizens to public policy and decision-making.

With these goals, and as Agamben argues (2004), the state of exception as paradigm of government can be extended to several situations in which currently states are governed and are governing the various crises which challenge modern structures of power. The centrality of the concepts and practices of “security” and of “management” of the “necessities” and “emergencies” of current “crises” and risks, in terms of scientific, political and juridical reproduction of the system of power, as they are reproduced in Agamben’s analysis, in this study, are read in conjunction with the STS and particularly in relation to the idiom of co-production, and to the idea of reflexive modernization.

Thus, I connected the idea of Agamben, on the one hand, to the implications which are suggested by Beck when he describes the bitter irony of risk in the radicalization of modern reflexivity. Through these connections, I aimed to consider the state of exception as the paradigm of government of risk controversies in late modern society, within the current governance of economic, political and institutional crises of this phase of modernity. On the other hand, considering the focus of this study on the constitutional implications of the (institutional) definition of ‘scientific risk issue’ and ‘scientific management’ concerning the biotechnology field, I considered jointly the analysis on the implications on the democratic systems addressed by Agamben, and those kinds of consequences on the reproduction of democratic states through the ordering of knowledge which are involved in the constitutional relationships between science, politics and citizens, in the coproduction of normative knowledge and social order, with particular regard to the approach of Doubleday and Wynne (in Jasanoff 2011), in their observation of the processes of regulation of the GMOs policy in one of the two national context explored in this research, in Britain.

Through the research of Doubleday and Wynne on the constitutional forms of government and governance in biotechnology policy in UK, and considering their argumentations on the implications of forms of scientism and scientific despotism in these processes of reframing nature and culture – through the ordering of life's science – I aimed to describe those particular forms of government which emerge by the affirmation/normalisation of states of emergency and necessity, in risk and crisis policies, and which are partly the result of the radicalization of scientist ideology of modernity and positivist models of modernization.

In the next subsections, the first focus is on a reconstruction of the reasons, argumentations and concepts which connect the state of the exception of Agamben to the analysis of the technoscientific and risk policies: in this sense, the conceptualization of the notions of necessity and emergency are particularly relevant in the attempt to link risk controversies to the general situations of crisis which are described by Agamben in his theoretical account of the state of exception. The second focus, through this connection, is on the state of emergency as justification of current forms of scientific despotism in risk biotechnology controversies and more generally in the crisis of contemporary democracies, considering Agamben's approach in the light of co-productionist ST debate.

The state of exception as the paradigm of government of risk controversy

Within the boundaries of contemporary capitalist democracies, the paradigm of government expressed by the state of exception, as it is presented[41] by Agamben (2004), can be considered a categorization of that form of power and sovereignty which rules in those circumstances in which the rule of law is suspended because of the public/institutional identification of potential or effective factors of public emergencies, crisis and necessity.

[41]"*The State of Exception* belongs to a series of genealogical essays that follow on from *Homo Sacer* and which should form a tetralogy. Regarding the content, it deals with two points. The first is a historical matter: the state of exception or state of emergency has become a paradigm of government today. Originally understood as something extraordinary, an exception, which should have validity only for a limited period of time, but a historical transformation has made it the normal form of governance. I wanted to show the consequence of this change for the state of the democracies in which we live. The second is of a philosophical nature and deals with the strange relationship of law and lawlessness, law and anomy. The state of exception establishes a hidden but fundamental relationship between law and the absence of law. It is a void, a blank and this empty space is constitutive of the legal system". (*An Interview with Giorgio Agamben,* 2004, By Ulrich Raulff, p. 609)

Taking into account the current diffusion of risk societies, and following Agamben's perspective, in this dissertation the paradigm of the state of exception or emergency is connected to the field of policy of risk, mainly, considering the generalizations which are introduced by the author about the centrality of the policies of security in modern democracies. Extending Agamben's paradigm to the current governments of crisis, the state of exception can be interpreted through the historical affirmation of *the state of security* (Foucault, 1968) as a central paradigm of government of modern states. This results particularly salient in those situations and fields of policies in which, as in biotechnology, the materialization of the state of exception, occurring between the structures and dispositives of the rule of law and the absence of laws, takes place within the general context of uncertainty and through the emphasis on the future (risk and/or benefits) which characterizes the GMOs controversy in public debates.

In this intersection between the juridical and political sphere, and considering, also, the recent and deeply innovative development of genetic engineering and in life sciences which requires a new corpus of regulation on life and living beings, the GMOs policy is mainly reproduced institutionally in terms of the (technoscientific) *management* of, on the one hand, the necessity and urgency of developing biotech enterprise for the progress of nations and populations; and on the other hand, as a matter of (technoscientific) *management* of the emergencies and risks which are supposed to be involved in the reproduction of GM products.

> This is the problem behind every security policy, ruling through management, through administration. In the 1968 course at the *Collège de France*, Michel Foucault showed how security becomes in the 18th century a paradigm of government. For Quesnay, Targot and the other physiocratic politicians, security did not mean the prevention of famines and catastrophes, but meant allowing them to happen and then being able to orientate them in a profitable direction. Thus is Foucault able to oppose security, discipline and law as a model of government. Now I think to have discovered that both elements – law and the absence of law – and the corresponding forms of governance – governance through law and governance through management – are part of a double-structure or a system. I try to understand how this system operates. (…) There is a French word that Carl Schmitt often quotes and that means: *Le Roi reigne mail il ne gouverne pas* (the King reigns but he does not govern). That is the *termini* of the double-structure: to reign and to govern. Benjamin brought the conceptual pairing of *schalten* and *walten* (command and administer) to this categorization. In order to understand their

> historical dissociation one must then first grasp their structural interrelation.
> (*An Interview with Giorgio Agamben,* 2004 By Ulrich Raulff, p. 611)

In the *reign* of (technoscientific) knowledge and information, in this ambivalent shift from the govern through law to the reign of management, from the claim of order of power institutions, to the affirmation of the paradigm of government of the state of emergency, the problem of security and the management of risk, emergency and necessity is placed by power institutions at the centre of public interest and as at the basis of the organization of social orders.

Following this centrality, in current knowledge societies the management (and the assessment) of emergency (and risk) is predominantly treated as a scientific matter (Doubleday, Wynne 2011). In this connection, it is possible to underline how the state of emergency and security, in current knowledge and risk societies, particularly in risk management and trough the GMOs case study, is sustained and legitimated through the technoscientific management of crises and emergencies.

Agamben's analysis is inspired from several philosophical studies, particularly, on the connection between the idea of the state of exception and the forms of sovereignty which govern and are established in those circumstances which seem, rather, to be dominated by the principle of *necessitas legem non habet* (necessity has no law). Moving from the paradigm of Carl Schmitt (1922)[42], and from his definition of the sovereign as "*he who decides on the state of exception*" (Agamben, 2004, p.1), and reporting a lack of theoretical approaches to the government of the state of exception in public law and juridical theories, in Agamben's perspective the problem of the forms of government in the state of exception is mostly a *quaestio facti* than a juridical and analytic trouble. In this sense, the state of exception represents for him the general paradigm of government of the current crisis: it is a general and common power dispositive in late modern democracies which emphasis is on the idea of structural "decline", and in the obsessive care of and attention on future, through the *technoscientific management* of the risk of 'decline' of western civilisation.

[42] "C. Schimitt, *Politische Theologie*, 1922.

> (…) There is no such thing as decline. Perhaps this is because the age is always already understood as being in decline. When you take a classical distinction of the political-philosophical tradition such as public/private, then I find it much less interesting to insist on the distinction and to bemoan the diminution of one of the terms, than to question the interweaving. I want to understand how the system operates. And the system is always double; it works always by means of opposition. Not only as private/public, but also the house and the city, the exception and the rule, to reign and to govern, etc. But in order to understand what is really at stake here, we must learn to see these oppositions not as "di-chotomies" but as "di-polarities," not substantial, but tensional. I mean that we need a logic of the field, as in physics, where it is impossible to draw a line clearly and separate two different substances. The polarity is present and acts at each point of the field. Then you may suddenly have zones of indecidability or indifference. The state of exception is one of those zones. (*An Interview with Giorgio Agamben,* 2004 By Ulrich Raulff, p. 612)

Considering this view and connecting it to the idea of co-production and hybridization between the constitutionally separated spheres of power, the state of exception consists in that theoretical paradigm through which I suggest to look at, in the GMOs case study, those forms of (partial and different) reduction of the democratic spaces and at the extension of those "*zones of indecidability or indifference*" constituted through the affirmation of states of emergency, as paradigms of government, in several national political contexts and at the European level. Through this perspective, I consider how the normalization of the state of emergency as paradigm of government, suggested by Agamben, seems to be supported and justified by the increasing enhancement of technoscientific governance[43], which implies dynamics of scientification of polity expressed by forms of scientism and scientific despotism through the affirmation or reinforcement of the model of technoscientific management of risk and crises.

Through the paradigm of Agamben, in the crisis of current democracies, on the one hand, the mechanism of "di-polarization" plays through the rhetorical and practical dispositives of power which operate through making-division between *sound science* and *weak science*, true science and pseudo-science, scientific facts and evidences, and subjective opinions: these distinctions constitute the basis on which policies and political decisions are integrated in the realm of "objectivity" composing the dynamics of the reproduction of the state of security. This occurs through the

[43] "At first glance it really does seem that governance through administration, through management, is in the ascendancy, while rule by law appears to be in decline. We are experiencing the triumph of the management, the administration of the absence of order" (*An Interview with Giorgio Agamben,* 2004, By Ulrich Raulff, p. 611).

affirmation of material and discursive boundaries and through dynamics of polarization between scientific and civic epistemologies, and of alienation of lay knowledges from public decisions, in the scientific knowledge domain in policies. Nevertheless, all these mechanisms of social adaptation of power structures to the social changes involved in the GMOs developments imply the implosion and fusion of political, juridical and scientific power under the affirmation of "zones of *indecidability*", in the explosion of hybrids risks of modernity.

Furthermore, the regulation of GMOs, both within and outside the boundaries of Europe, not only constitutes a question on which public resistance, mistrust and social conflicts have been developed and diffused, but also it has involved intense disputes between the three branches of government (legislature, executive and judiciary) and between the supranational and state level of biotechnology normalisation, with particular regard to the controversy about the production and commercialization of GM food. In several countries and with specific and different characteristics, these conflicting processes have emerged through the construction of biotechnology and GMOs networks and class-actions in favor or against the decision of authorizing the commercial release of GM products by the national and supranational regulatory bodies, and within the general public contraposition regarding the scientific, political, economic and juridical management of this issue.

After a period of legal ban in Europe, based and justified mainly, by European institutions in international arenas, on the insufficiency of the scientific evidences which could prove the safety of GMOs, under the pressure of the international regulatory bodies, the disputes moved into the European and national legislative and executive branches, and in the EU the aim has been, in the last two decades, the creation *ad hoc* of an intricate set of legal and scientific means, institutions and structures in order to overcome the requirements for a precautionary approach which could have allowed the commercial release of GMOs in the European boundaries.

Considering the principal facts which constitutes the development of the GMOs controversy and policy on the international and European contexts[44], and taking into account the several specific characteristics of the national frameworks of regulation, the paradigm of the state of emergency shows how the evolution of the regulatory agency responsible for GMOs reveals a political practice, scientifically and not publically legitimated, which is not based on commonly agreed rules but rather on regimes of exception, in which the legal system has consistently been violated in the name of governability[45].

Looking back on the controversial history of the GMOs biosafety regulations in Europe, and particularly in the agro-industrial sector, the evolution of this regulatory framework exemplifies a political practice, present in western democracies, of governing not by pre-established rules (that in the GMOs case should correspond, first of all, to the application of the precautionary principle[46]), but through states of exception (Agamben 2004), which correspond, for example in the Italian case, to a policy completely constructed on the basis of a series of government's decrees[47] that have been the result of emergency and governmental acts, in order to manage the potential risk of contamination from the GMOs diffusion on Italian territory. At stake is the exercise of power, which requires the establishment of such regimes in order to assure conditions for governability. This exercise of power is not based on the legality of the procedures through which laws, governmental decisions and political actions are developed, but rather on an interpretation of the dominant public interests of managing risks, which are ultimately supported by a set of technoscientific argumentations which give legitimacy to those political decisions which are however taken through several levels of suspension of the rule of law.

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[44] "Given those expert disagreements in the 1990s, EU-wide regulatory conflicts led to numerous court challenges, especially over food products. Sometimes these involved conflicts about how to interpret the precautionary principle. The European Court of Justice faced national regulatory differences – not only regarding claims for food safety, but also regarding uncertainties about evidence". The conflict and scientific disagreement is considered as the exception, and this means that Science, with the Capital S, is normally identified as a field of consensus…

[45]

[46] The precautionary principle is in itself a state of exception…

[47] Agamben, the decree is one of the most 'important' instrument in the 'normalisation' of the affirmation of the state of exception as the normal way to regulate critical policy ….

Considering these elements, the general connections between the paradigm presented by Agamben and the biotechnology risk policy in EU is expressed by the conceptualization of the state of exception as a form of govern of necessity and emergency[48], and through its character of subjectivity and the subjective exercise of power. Nevertheless, this feature of subjectivity of power in the state of emergency and necessity is, rather, obscured through the affirmation of the scientific objectivity as the basis of legitimation of the suspension of the rule of law. But, in any case, several social conflicts arise through this kind of hybrid controversies, public contradictions and *zones of indecidability*.

> The state of necessity, on which the exception is founded, cannot have a juridical form, but it is difficult even to arrive at a definition of the term given its position at the limit between politics and law. Indeed, according to a widely held opinion, the state of exception constitutes a "*point of imbalance between public law and political fact*" (Saint-Bonnet 2001, 28) that is situated – like civil war, insurrection and resistance – in an "*ambiguous, uncertain, borderline fringe, at the intersection of the legal and the political*" (Fontana 1999, 16). The question of borders becomes all the more urgent: if exceptional measures are the results of periods of political crisis and, as such, must be understood on political and not juridico-constitutional grounds (De Martino 1973, 320), then they find themselves in the paradoxical position of being juridical measures that cannot be understood in legal terms, and the state of exception appears as the legal form of what cannot have legal form. (Agamben 2004:1)

In the light of this conceptual framework, and considering the GMOs case study as a risk issue which regulation is conceived as an emergency and as a situation of political and social crisis, the management of this public controversy occurs in the governmental difficult to reproduced objectivity from the subjective suspension of the rule of law, and to create objective system and measures able to regulate the social contradictions, resistances, and frictions which arise through the biotechnological emergency. Connecting Agamben perspective with the conceptualization of the idiom of coproduction, it is possible to contestualise the processes of hybridization between scientific, juridico-constitutional and political structures and agents as that condition for which the state of exception appears as the legal form of what cannot be expressed through a legal-objective

[48] "The uncertainty of the concept is exactly matched by terminological uncertainty. The present study will use the syntagma state of exception as the technical term for the consistent set of legal phenomena that it seeks to define. This term, which is common in German theory (*Ausnahmezustand*, but also *Nostand*, 'state of necessity'), is foreign to Italian and French theory, which prefer to speak of emergency decrees and state of siege (…). In Anglo-Saxon theory, the terms martial law and emergency powers prevail" (Agamben 2004, p.4).

form. In this sense, I express the idea of the co-production of the state of exception as the result of the hybridization between technoscientific, political and juridical forms of government in those circumstances institutionally defined as "ambiguous, uncertain" and situated in the "borderline fringe at the intersection" of the legal, political, scientific and social orders which have to face social crises and public resistance.

If we consider the GMOs issue as based on the affirmation of discourses and practices typical of the establishment of the state of exception, which is founded firstly on the necessity to reinforce a scientific disposition of policy and politics, the state of emergency as the paradigm of government of the GMOs controversy is constituted as a "*point of imbalance between public law and political fact*", mainly for the reflexive uncertainty alimented by the reproduction of these processes of innovation. In fact, in the field of biotechnology regulation of the GMOs risk, the 'measures', in Agamben's terms, have to be considered as technoscientific measures, evaluations and planes of assessment and prevention of emergency, risk and necessity.

In this sense, I aimed to extend the perspective of Agamben, where he expresses the idea of impossibility to keep apart and separate, in these forms of governments, political and juridico-constitutional grounds, to the field of science, thus considering also the state of exception as a coproduced instrument, particularly functional to the exercise of power in the dynamics of governance of risk, crisis and uncertainty, which operates through the obscuration of the intersections between different fields of power and authority[49]. The co-produced "measures that cannot be understood in legal terms", from the perspective of this research, can, rather, be

[49] Linking Agamben's paradigm to the analysis of Democracy and despotism in the management of the GMOs policy by Doubleday and Wynne: "The shocks of the Brent Spar, BSE and GM controversies provoked a significant shift in scientific governance in Britain, marked by an explicit concern for building public trust through greater openness to public scrutiny and participation. Foremost among the many articulations of the British state's newfound concern for public engagement in science were a series of interventions by parliament, the executive, and the judiciary in the year 2000: the House of Lords Science and Society report; and the establishment of the Food Standards Agency, as well as inclusive standing commissions covering human genetics and agricultural biotechnology; and The Phillips Inquiry into the BSE crisis. This shift condensed around a set of practices for eliciting public views through formal techniques of "public engagement." A departure from past governance approaches, this potential space for democratizing science policy was itself shaped by British political institutions and civic epistemologies – negotiating consensus around empirical demonstrations of public attitudes" (Jasanoff 2005, p. 247-271).

understood if they are read as in their affirmation as technoscientific measures and, thus, through the idea of scientification of the management and governance of risk as that process which makes invisible the deep dynamics of the co-production of normative knowledge. Looking at "the state of exception" through the lens of the processes of scientification, and thus as a dynamic of obscuration of co-production of power-knowledge, the state of emergency "appears as the legal form of what cannot have legal form". Ultimately, in the expression of this impossibility to give a legal form to the state of exception, in order to legitimate this contrasting situation, the state of emergency seems to take the form of scientific despotism.

Furthermore, the pervasiveness of this model of government of current situation of political, economic and institutional crises of contemporary democracies is shown by Agamben when he argues that the state of exception, founded on the very ambiguous and subjective idea of necessity and emergency, can be considered as the paradigmatic basis of current governments of the crisis of modernity. The connection with the kind of crisis co-produced by the processes of rationalization and scientification of social orders, and through the explosion of the world of hybrids, in Agamben is retraceable in his idea that this shift from which current democratic systems are regularly governed by state of exception is dealt by the constitutional emergency powers formally framed in modern laws, and expressed by the implications and consequences of "the atomic age".

> The state of exception has by now become the rule: "*in the Atomic Age upon which the world is now entering, the use of constitutional emergency powers may well become the rule and not the exception*"[....] "*In describing the emergency powers of the western democracies .... Such techniques of government as executive dictatorship, the delegation of legislative power, and lawmaking by administrative degree were purely transitory and temporary in nature.... The instruments of government depicted here as temporary 'crisis' arrangements have in some countries, and may eventually in all countries, become lasting peacetime institutions*". This prediction, which came eight years after Benjamin's first formulation in the eighth thesis on the concept of history, was undoubtedly accurate; but the words that conclude the book sound even more grotesque: "*No sacrifice is too great for our democracy, least of all the temporary sacrifice of democracy itself*" (Agamben, 2004: 9).

In a world in which risk and emergency result to be at the centre of the dynamics of the reproduction of modern authorities, in their activities of assessment and prevention of several crises

of the system, and in the management of the consequences of reflexive modernization, the *sacrifice* of *democracy* consists in the restriction of democratic freedoms in the name of the security of the system, through the rhetoric of the (necessity of) prevention of risks – of several natures – and through the establishment of emergency technoscientific disposition of power exercise. This perspective appears connected to the idea of bitter irony of risk societies of Beck, and they are both founded on the construction of a theoretical framework in which necessity and emergency are considered as the normal situations in which policies, politics, and the reproduction of social orders occur in the crisis of modernity.

> Faced with the unstoppable progression of what has been called a "global civil war", the state of exception tends increasingly to appear as the dominant paradigm of government in contemporary politics. This transformation of a provisional and exceptional measure into a technique of government threatens radically to alter – in fact, has already palpably altered – the structure and meaning of the traditional distinction between constitutional forms. Indeed, from this perspective, the state of exception appears ad a threshold of indeterminacy between democracy and absolutism. (Agamben 2004: 2-3)

The several measures and mechanisms of the suspension of the democratic rule of law, in the governmental management of crisis and emergency, are based on the creation and development of different sorts of governance of necessity, which are supported, most of them, from the perspective of this research, by the naturalization of the preordination of technoscientific domain in risk policies. As Agamben describes, the suspension of the rule of law, by the affirmation of the state of necessity, does not imply or mean necessary its abolition, and the zone of exception is not reproduced outside from the politico-juridical order.

Rather, considering the perspective of this research, and particularly the idea of co-production of normative knowledge, the state of necessity, at least for what concern the regulation of risk issues, is constitutively situated in the intersections between scientific, juridical and political authorities. This co-productionist perspective, in Agamben, even if there is not the direct reference to technoscientific authorities in the definition of the state of exception, and it is mainly explored from a juridico-political viewpoint, is retraceable in the fact that "*the state of exception is neither external*

or internal to the juridical order" and "*it concerns precisely a threshold, or a zone of indifference, where inside and outside do not exclude each other but rather blur with each other*". Within current knowledge societies, adding the constitutive emergency power of technoscientific apparatus, particularly in risk assessment and management, and in the different situations of emergency, necessity and crisis, and connecting Agamben's paradigm to the theoretical framework presented so far, in the words of the author it is possible to read the connotation of the co-production – involving science, politics, law, economic instruments and social challenges – of the state of exception in risk controversy.

Thus, in order to summarise the elements presented so far, in these critical challenges the link between the paradigm of the state of exception and the forms of government and governance of risk is designable in the centrality of the concepts of emergency and necessity, which are conceived, in Agamben's analysis, as 'naturalised' in modern systems of government.

> A recurrent opinion posits the concept of necessity as the foundation of the state of exception. (…) *necessitas legem non habet*, "necessity has no law" (…) is interpreted in two opposing ways: "necessity does not recognize any law" and "necessity creates its own law". In both cases, the theory of the state of exception is wholly reduced to the theory of the status necessitates, so that a judgment concerning the existence of the latter resolves the question concerning the legitimacy of the former. (…) It is only with the moderns that the state of necessity tends to be included within the juridical order and to appear as a true and proper "state" of law. The principle according to which necessity defines a unique situation in which the law loses its *vis obligandi* (…) is reversed, becoming the principle according to which necessity constitutes (…) the ultimate ground and very source of the law. (…) For (Santi) Romano, not only is necessity not unrelated to the juridical order, but it is the first and originary source of law. (Agamben 2004:24-27)

As for the connotation of risk situations, uncertainty and crisis, the state of necessity is founded on the dimension of subjective judgments[50] and individual and social representations which concern assessment on uncertain facts and partial predictions. As Agamben underlines, necessity, as well as the idea of emergency, is a completely subjective concept which involve first of all judgments and dynamics of imagination and representation of something which is not already displayed: for example, in the biotechnology case the risk for which the necessity (of technoscientific domain in

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policy) is imposed cannot be conceived as objective. The subjectivity of necessity is also referred, in Agamben's perspective, to the different achievements which the systems, in crisis, organize as the priorities for governing the same necessity and the emergency, as they are defined.

Nevertheless, in the claim of rational and scientific objectivity[51], neutrality and independency of science and its pre-ordination in policy and politics as the normal condition of decision making, subjectivity and uncertainty, following Agamben's paradigm, undermine this structure of power and seem to appear as synonymous of arbitrary and illegitimate forms of government based on the partiality of the idea of necessity and emergency.

In the explosion of social conflicts and public mistrust of risk society, the normative knowledge which governs in the state of suspension of the rule of law is the expression of the subjective affirmation of a condition of effective or potential crisis for which special restriction of the democratic course of decision are given as necessary. Thus, the necessity to suspend the rule of law is ultimately justified in order to keep far, from the decision making and from the scientific disposition of the policy, any extra-scientific element that can, rather, in this rhetorical exercise of power, make irrational the rationalized assessment and management of critical matters. This alienation of extra-scientific rationalities and elements deals to the idea that, through the mechanism of the state of exception and of the suspension of the rule of law, there is the affirmation of forms of undemocratic government of risk, crisis and uncertainty, because there is the restriction of democratic participation to public decisions. This 'sacrifice' of democracy can be expressed by the conceptualisation, through the paradigm of the state of exception, of forms of scientific despotism and scientism through which the subjectivity of necessity is made, rather, objective through the

[51] Critical analysts identify a further tension between transparency and objectivity. 'Increased transparency in risk decision-making has made it apparent to all stakeholders that risk analysis is not a purely objective process as it has been previously portrayed' (Frewer, 2002:16). Expert advisors 'work hard to enact objectivity'. Often 'competing performers actively work to "backstage" some bits of information, while "front-staging" others', thus downplaying diverse views (Hilgartner, 2003: 14, 18). In enacting objectivity, then, expert procedures may shape and limit transparency. All those perspectives on advisory expertise can help to analyse recent EU institutional changes.

claim of neutrality and independency of scientific evidences and facts which rule in politics and policies.

> The concept of necessity is an entirely subjective one, relative to the aim that one wants to achieve. It may be said that necessity dictates the issuance of a given norm, because otherwise the existing juridical order is threatened with ruin; but there must be agreement on the point that the existing order must be preserved. A revolutionary uprising may proclaim the necessity of a new norm that annuls the existing institutions that are contrary to the new exigencies; but there must be agreement in the belief that the existing order must be disrupted in observance of new exigencies. In both cases (…) the recourse to necessity entails a moral or political (or, in any case, extra-juridical) evaluation, by which the juridical order is judged and is held to be worthy of preservation or strengthening even at price of its possible violation. For this reason, the principle of necessity is, in every case, always a revolutionary principle. (Baladore-Pallieri 1970:168 in Agamben 2004:30)

Through the focus on the GMOs controversy and biotechnology regulation the analysis of the state of necessity can be directed in different trajectories: on the one hand, it can concern the rhetoric of risk and crisis of current late modern societies that is imposed through the reinforcement of the rationalization and scientification of the structures of power and decision-making, on the basis of the reaffirmation of modernist and neo-positivist models of public management of disorder in the scientific organization of modern societies. On the other hand, it can be observed through the fact that biotechnology is characterized for its development as a revolutionary technoscientific innovation which requires special processes of normalization, in the light of all the scenarios both of risk and benefits and possibilities for human development, considering the global and local level of this policy.

In the next pages I deal this theoretical analysis presenting the connections which I see between the affirmation of the (conceptualization of the) state of exception as the paradigm of government of risk policy and the (study of the) constitutional implications of this undemocratic shift in the current crisis of risk and knowledge democracies.

The constitutional implications of the state of exception in risk controversies: scientific despotism in the GMOs regulation

Through the comparative analysis of the regulation of GMOs in Europe, during the last three decades of administration of biotechnology risk, within the European knowledge society, the state

of emergency and necessity can be interpreted as that form of governance of uncertainty and disorder embedded in the current paradigm of government of risk policy, particularly looking through the weaving of variegate forms of relationships between supranational and national governments, technoscientific subjects and citizens; and through the affirmation and institutionalization of spaces of scientific domain in policy-making, which reproduces problems of democracy in risk and, particularly, biotechnology regulation.

From a legal and institutional point of view, at the European level, considering, particularly, since 2002 the crucial role of EFSA[52] in the assessment and management[53] of the GMOs controversy, the

[52] After the EU's 1997 reforms of advisory expertise, the new arrangements and, generally, this central component of risk policy-making have increasingly been treated as democratically problematic for many aspects and in relation to several stakeholders of 'scientific' policies. Progressively more the problem of democracy within these areas of policy-making defined as 'scientific' matters became a public discourse of crucial relevance, in testing democracies and their level of democratic public legitimation particularly in relation to those processes of decision-making predominantly developed through the iper-rationalised approach of science-based policy. In these fields of public interest, both science and national and supranational governments are challenged by a strong and diffused tendency of public mistrust and detachment of citizens from the structures and institutions of power. At the European level, one of the principal problems concerning advisory expertise has regarded the development of a centralised and harmonised European system of scientific advisory which could coordinate expertise of different countries, but in a unique normative structure through which to make order in the risk of disorder of knowledge society. EFSA has been institutionalised in 2002, and it has represented the answer to this exigency of centralization of advisory expertise, particularly in risk and controversial policies, within the EU. In this regard, I want to underline how this exigency is the result of a series of different and conflicting positions, commitments and interests, which go beyond the normal practices of scientific assessment embedded in the development of rational policy within modern states, as economic pressures from the international context in order to have in all the European territories a unique system of scientific advisory which would have dealt in those 'scientific' controversies through uniform regulations, in agreement to the commercial circulations of new products in which expert knowledge and technology are embedded. Furthermore, in this new asset of advisory expertise, the problem has been and is in regard to national agencies, committees and institutions of scientific advisory and their role in the European and national processes of political and juridical advising. Another deep problem concerns the relationships between citizens and scientific subjects, particularly those involved in advisory expertise, which increasing appear in competition each other in the democratic processes of participation to public policies. Particularly in risk assessment and management at the European level the general tendency has been to divide in two spheres of power and authority the assessment of risk and the management of risk. Thus, the complicated question of advisory expertise within the European knowledge society represents a crucial node of the entire structure of reproduction of the European public credibility and for its affirmation as a knowledge community dealt by rational, harmonised, and science-based policies.

[53] "According to leading members of EU-level expert committees, their role was hindered by the lack of in-house scientific expertise (…), and often their own advice conflicted with national expert views" (James et al. 1999: 8). Even after functionally separating risk assessment from risk management, "the current risk assessment process… has negligible input from those dealing with issues of risk management, on practical options for change or on the validity or effectiveness of control measures. Therefore the overall procedure needed 'to ensure articulation between these two components of the risk analysis process'. Moreover, public-interest groups had little access to the process and judgements which formed expert advice" (ibid: 43). The focus suggested in these words is on the emergency of greater public participation and scientific transparency, with systematic links between advisory expertise, risk managers and stakeholders. But, in any case, from the perspective of this research, this asset – being upstream based on the centrality of risk in 'scientific' policies – reflect a predominance of the scientific assessment on the (in any case scientific) management and an extensive dependency – and not division – between these two areas of public definition. On the other hand, various European and national expert committees work in risk assessments, very often producing different outcomes, and in this sense expert advice is an integrated and functional political instrument within EU-national

state of emergency as the paradigm of this risk policy is retraceable, firstly, in the affirmation and development[54] of the precautionary principle as the basic regime of the regulation of emergency situations of 'scientific uncertainty', risk and environmental crises. On the basis of this consideration, the precautionary principle implicitly affirms the idea of a normal course of governmental and political actions in which: *a)* there is *normatively* a scientific pre-disposition and disposition of policy and decision making; and *b) normally* it is possible to have 'full scientific certainty' about the impacts, consequences, implications and eventual damages of the processes of human intervention into the environment. The 'first' democratic implication is that this scientific pre-disposition of power assumes as its model of political intervention and takes for granted the translation of social, economic, political and cultural public problems of late-modernity into scientific matters. This is particularly visible through the explosion of the reflexive consequences of modernity where increasingly the necessity to predispose emergency plans of governmental actions

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conflicts. "The legitimacy and the autonomy of the European Commission, and indeed its *rapports de force* with the EU member states, are thus being displaced to the arena of scientific expertise'" (Dratwa, 2004: 13). The question of expert disagreements represents for the EU a "source of much confusion and tends to undermine the credibility of the risk assessment process." Thus, in this view, the EU expresses the emergency "to harmonise the process" (the EU's Scientific Steering Committee, SSC, 2003a). All these levels of problem-solving in which are involved processes of information, acknowledgment, proposal and organization of normative instruments of law, standardisation, classification, and management of these different steps of policy, have produced the basis for legitimating the creation of a centralized agency for EU expert advice, mostly with the end of harmonising expert advice for "science-based regulation". Thus, in the White Paper on Food Safety (2001), the Commission pointed out its plan for a European Food Safety Authority (EFSA): it would have been structured through the establishment of its own in-house expertise. EFSA's achievement is the constitution of greater cognitive authority for coordinating, controlling, challenging, improving and interacting with national expert bodies.

[54] In the Italian full version of this research I tried to reconstruct the international and European origin of the precautionary principle, its theorisation and evolution in the course of the development of international law, and its history within the European boundaries. Also I tried to frame its application in the field of biotechnology regulation and in the GMOs policy, and through a confrontation with the (American) principle of substantial equivalence of the GM products, trying to underline both the conjunctions and differences between these two approaches of normalization of risk, which have produced several and sometimes different political results among European countries and between European and USA. But, at the same time, I considered how at the basis of both the principles, which deal the GMOs regulation in different cultural and political countries, there is: a) the preordination of scientific advice on any other extra-scientific matter implied in the GMOs policy; b) the treatment of the GMOs policy predominantly as both a policy of risk, and, ambivalently, as a necessity for human development. In any case, connecting these elements with the analysis of this section, here the emphasis is on the elements, instruments, mechanisms and dispositives of the state of necessity and emergency within the European development of both the precautionary principle and the system of advisory expertise in the European (biotechnology) risk regulation. This is to highlight how in the last decades all these developments in the relationships between science, politics and citizens have been reproduced through the perception of deep problems of democracy particularly in the definition of 'scientific' policies, and within a critical and diffused context of delegitimation of governmental and scientific authorities expressed by the general public attitude of mistrust and skepticism toward economic, political, scientific and juridical assessment and management of risk. Furthermore, as I argued in the Italian version, through this perspective I intended to emphasise the fact that the more recent affirmation of the precautionary principle within international political and international arenas has to be read in connection with the manifestations of risk societies and the explosion of the discursive, cognitive and material consequences of the processes of modernization.

seems to be a priority in the ordering of uncertainty, risks and crises that appear as intrinsically involved in the current processes of human innovation and development.

> In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. (Rio Declaration, 1992)

Following the precautionary approach, and connecting it with the paradigm of government of the state of emergency, ambivalently scientific uncertainty is conceived as the exception for which is required a special regime of regulation which involves the reinforcement of the idea of centrality of scientific domain in policy-making through mechanisms of scientific assessment and advising. Nevertheless, in this structure, the exception – risk – becomes the rule of law, especially if we consider the fact that, the special regime of precautionary principle should be applied even when the uncertain processes and products have already been normalized and put into action and circulation. Reading the precautionary approach through Agamben's terms, the legal form of *what cannot have legal form* – the regulation of (scientific) uncertainty – is represented by the affirmation of a state of exception, emergency and necessity legalized and normalized through a scientific regime of assessment and management of risks involved in the reproduction of structural uncertainty of democratic systems. In the biotechnology regulation, this mechanism of power works through the predisposition of the GMOs controversy as a matter of scientific uncertainty and risk which allows implementing particular kinds of risk policies through the establishment of a scientific government of the necessities and emergencies implied in GM products. Through a governmental regime based on the scientific assessment and management of risk, the precautionary principle gives the juridical legitimation to the necessity and emergency to develop a special precautionary system of regulation in which the (implicit) suspension of the rule of law is expressed through the juridical predisposition of zones of governmental undecidability *except* through this preordination of scientific maneuvers, mechanisms and dispositives of assessment and management of risk policies. At the same time, public concern and resistance toward the economic, political and scientific

management of risks are included as elements and factors of emergency and uncertainty in the development of these policies. All these interconnected governmental necessities and emergencies can make visible the contradictions and crisis of legitimacy of power institutions in risk policies, and the several questions of democracy arising through scientific regimes and through the affirmation of form of scientific despotism in the ordering of social resistance and in the obsession of controlling uncertainty of risk and knowledge European societies.

Furthermore, considering the field of biotechnology regulation relating to the GMOs agro-industrial sector, at the European level, the existing juridical previsions linked to the precautionary principle were systematically adapted to the development of the international commercialization of GMOs, and in any case they are applied under the guise of governability, ultimately, in order to satisfy the commercial interests of biotechnology companies, trying to reinforce, at the same time, the credibility of European scientific and governmental institutions.

Thus, one of the common elements which characterize the different European contexts of the GMOs regulation is the particular emphasis on and the domain of risk issue concerning the assessment and management of the scientific uncertainty of biotechnology processes of innovation. From this perspective, the role of scientific and expert advising in policy making is placed at the centre not only of the GMOs assessment activities, but it represents also the core of the legitimation of the practices, discourses and actions of the GMOs risk management. Here I see an incontrovertible connection between the affirmation of the state of emergency as the current paradigm of government of risk policy and the constitutive role of scientific authorities in these same processes of constitutional normalization and legitimation of these states of emergency.

Nevertheless, in risk society the structure of assessment and management of ‘scientific’ controversies seems to be undermined by the explosion of the consequences of the processes of modernization, and in fact scientific risk regulation has faced a crisis of public credibility in the EU. Since the mid-1990s, the BSE crisis has been associated with other food safety controversies, where

technoscientific advising procedures, for example, about the level of dioxins, additives have been placed at the centre of public debate. Reflexively, these risk crises undermined social trust, opening public sphere to social conflicts, and extending national regulatory differences, which very often are in contrast with the necessities of international and European market.

Within the European boundaries, in response to these crises, EU and national authorities have been involved in institutional reforms, which have been aimed to make visible, publicly and in an ambivalent way, that regulatory procedures, on the one hand, are constructed as science-based, which means ultimately that are founded and legitimated on the presumption of neutrality and independency of technoscientific advise; and, on the other hand, that these public decisions and reforms would have taken into account public concerns, consumer interests and scientific uncertainty.

In this sense, I suggest that in order to face different conflicting tendencies, in Europe, the GMOs regulation is entrapped in a systematic use, on the one hand, of the state of emergency and necessity legitimated on the basis of the superordination of technoscientific knowledge; and on the other hand, in the emergency and necessity of public trust. This is institutionally faced through the affirmation of systematic processes of disjunction and division between the different issues related to the GMOs controversy, and through the reproduction of certain kinds of sub-policies which are claimed to be implemented in order to develop a stronger institutional account of public concern and to channelise social conflicts and public participation in institutionalised processes of the GMOs policy-making. Thus, the developments of reforms in the field of advisory expertise in Europe have been interpreted as relating to problems of democracy of science in politics and policy, and as strictly connected to the creation of policies which remark question of public concern's accountability, and problems of public participation. This is part of the implicit dimension of reflexivity which is implied in the GMOs 'risk' controversy. This might show how the government of risk, through its predominant scheme and paradigm of (fictitious) division between the scientific

risk assessment and (governmental-political-legal) risk management, lets rise deep question of democracy, particularly, in those fields of policies which are defined through the category of emergency and necessity, as in the GMOs case study.

Moreover, this connection between (the necessity of) reformative policies of the advisory expertise and (the urgent implementation of) experiments of public engagement with science, within public national and supranational structures and authorities, demonstrates also how in Europe public institutions are expressing strongly the emergency of public trust and social consensus around crucial decisions of internal policies, in the institutional necessity to overcome the current crisis of legitimacy. Here, I intend to highlight how the formation of the policies of public engagement with science, in Europe, and particularly in the UK case study, represent an instrument not only of wider public participation to 'scientific' governance, but, rather, they work mostly as that dispositive of power in order to control public resistance, mistrust and social conflicts. This is visible through the comparison between the Italian and British contexts, where these experiments of public engagement with science have had a different application and intensity, according to the ends and to the forms of strumentalisation which the two national biotechnology networks have developed in relation to public attitude to GMOs. At this regard, as I shall underline particularly in the next part of this dissertation, the policies of public engagement with science, in 'scientific governance', are developed in different ways within the diverse national contexts which I'm referring in this comparison: in fact, confronting the Italian and British framework of the GMOs regulation, in Europe, it seems that on the basis of the different positions (in favor or against the development of the GMOs policy in agro-industrial sector) of the two national central governments, these experiments of public trust's reconstruction and public engagement with science are differently experienced by national public institutions. In Italy, where the position of the government (completely against the biotechnology enterprise) converges with the general public opinion, these sub-policies have not been developed so far. In the Italian national context, rather, we can observe some different attempts of public engagement with science directly from a class-action of scientists,

Italian scientific societies and groups which have tried to involve citizens through media communication and public demonstration, and through different political manifestations, for a national choice in favor of the GMOs research and development, banned in Italy since 2000-2001. And *vice versa* they have expressed a position against the forms of 'obscurantism' and 'political despotism in the name of a pseudo-science' which have made in practice by the Italian government, with the manifestation of its policy of zero tolerance to GM products.

In Britain, where the position of the central government supports biotechnology enterprise and, rather, there is a strong opposition to GMOs around public national opinion, considering also the atmosphere of food crisis in this country in the decades of development of the GMOs controversy, from the documents, discourses and practices of British government and jointly from the assertions and claims of the main national scientific societies, it emerges clearly the necessity to overcome the problem of public mistrust and concern about crucial fields of research and development. Britain is in Europe one of those countries which can well represent this model of disjunction between, on the one hand, a policy completely based on science, and, on the other hand, the construction of these sub-policies aimed to regain the public consensus around an issue on which, rather, social concern and conflict arise and are manifestly against the ways of governing in this scope, for several deep reasons partly linked to the profound changes involved in the recent development in life sciences, and their crucial role in the dynamics of reproduction of public meanings about life, rights, citizenship, risk, uncertainty, crisis, etc.

Underling these different exigencies between Italy and Britain, I consider these forms of pubic engagement with science as a mechanism through which social conflicts, around the current scientific, political, economic and juridical management of research and development policies, are tried to be institutionally controlled, and with the attempt to strengthen public consensus.

Moreover, through these differences between the Italian and British case, I aim to highlight the character of subjectivity through which the state of emergency and the structure of risk regulation

are sustained, with a particular focus on the fact that the question related to the democracy of 'scientific' risk governance comes to be restricted, in different ways, to a question of public trust and consensus to achieve by scientific and political institutions concerning struggles of social resistance to dominant trajectories of innovation and development. Following this perspective, these different results of policy, in Italy and Britain, can be read as a sign of the different processes of obscuration and alienation of different meanings in the reproduction of biotechnology dominant discourses. This occurs partly through the way in which the character of subjectivity works in the reproduction of these dominant meanings in the GMOs regulation: this means that in Italy the state of emergency is supported by the affirmation of the central government of the idea of insufficient scientific evidences in order to develop the biotechnology enterprise in its different field of application; in Britain, through the affirmation of a special regime of science-based policy, the central government has developed its interest to invest in this field of research and development, and it is supporting promotion campaigns in order to construct the idea of the UK as a "GM nation". These different and subjective uses of the state of emergency and necessity as paradigm of government produce diverse democratic implications and are developed through singular relationships between scientific and governmental authorities and citizens.

Nevertheless, in the current crisis of institutional legitimacy, while considering the reproduction of different political decisions and results through the affirmation of the state of emergency, it is possible to observe a common power mechanism of reproduction of "*zones of indefinability and undecidability*" (except through technoscience): in effect, these are institutionally framed and defined thorough the predominance of scientific meanings. Both the processes of decision-making, in Italy and Britain, result to be oriented and dominated by a paradigm of necessary and emergency scientific governance. Yet, this centrality of scientific role involves different implications and questions of credibility and problems of public trust.

Connecting these mechanisms of scientific definition of the indefinability, in the different conflicts and challenges of the national systems of the GMOs regulation, to the European level, and considering this last as the common legal basis of the two states of this comparison, it is possible to argue how the state of emergency and necessity constitutes the basis of legitimation of the European system of risk regulation, implying questions of scientific and political authorities' credibility and legitimacy, and problems of democratic participation to public decisions, being reproduced processes of alienation-subordination of citizens' meanings and rationalities to those coming from scientific domain.

Concerning the EU system of risk regulation, all these questions regard the historical and constitutional development of relationships of reciprocal integration between the reproduction of scientific authority, agencies and committees and the construction and affirmation of the idea of the European knowledge society: in the case of the GMOs controversy, the production of scientific institutions, centralized and conceived as 'arbiter' of international legal controversies, is strictly connected to the European exigency to increase the level of public credibility and trust in European institutions, constructing a common scientific basis of political, economic and social integration. In this regard, scientific management of biotechnology enterprise has been sustained through the affirmation of a central normative system established in order to regulate the commercial release and circulation of GM products, and in order to restore public trust in the European knowledge society. EFSA establishment has answered to these emergencies and necessities. In this sense, reforms have sought to "Europeanise" advisory expertise, through the constitution of new bodies and procedures to accommodate or adjudicate between divergent views among national experts.

In fact, juridical, scientific and political procedures are mixed together in order to succeed in holding up the commercial release of GM products, from the necessity of labeling rules, particularly required by consumer defense legislation in several European countries, to a corpus of legislation in

order to improve[55] the GMOs regulation both in terms of efficiency and concerning the necessity of accelerate the diffusion of GMOs in Europe: the history of these conflicting tendencies of regulation can be summarized from a position of caution and extensive application of the precautionary principle to the development of a policy in support of particularly GM crops, with the consequence of different national and public reactions.

Following this perspective, in those fields of policies which are defined for the character of scientific uncertainty and risk, through the affirmation of a scientific regime of necessity and emergency, the cognitive, discursive and material development and reproduction of authorities, within contemporary democracies, appear to be strictly connected to the different relational forms between science, politics and citizens which characterise singular and situated national cultures, in the explosion of risk controversies.

> At the turn of the millennium, a series of fiascos over scientific advice to government challenged the peculiarly British ways in which such advice had been procured, framed, and used. Prominent episodes included controversy over decommissioning the Brent Spar offshore oil facility, resulting in Greenpeace's victory over the UK Government and Shell in 1994; and the crisis over the UK Government's handling of BSE (or mad cow disease) which came to a head in 1996 (Grove-White 1997; van Zwanenberg and Millstone 2005). Such challenges to the presumptive authority of scientific advice over public policy and public life proved fertile ground for controversy over genetically modified (GM) crops over several years straddling the Millennium. These crises expressed and intensified what we argue has amounted to a constitutional un-settlement of relations between the state, science, and citizens in Britain. (Doubleday, Wynne, in Jasanoff 2011:1)

From this perspective, in these recent crises in the UK, the state of emergency seems to be retraceable around peculiar relationships between science, state and citizens. In the analysis of Doubleday and Wynne, it is expressed the idea of a form of power, in the current crises of modern

[55] "If the current EU approval rate does not improve, there will be serious trade repercussions. Countries around the world approve and allow farmers to plant products in a more timely fashion. Some are making efforts to make their authorisation systems more efficient. The EU's main suppliers of protein are less inclined to wait for EU approvals prior to approving and planting in their country. Challenges resulting from asynchronous authorisations as a result of a slower authorisation rate have caused trade problems costing billions to importers, food/feed processors and farmers. The number of such incidents is likely to increase. 6. EU farmers suffer economic losses as a result of the delays in the authorisation process. The absence of EU decisions on cultivation applications due to the failure to advance products through the system means that European farmers are being denied the choice of products available to farmers around the world. The high cost and unpredictability of the EU system means SMEs are not able to commercialise GM products. The problematic authorisation system has a negative effect on investment in innovation, which affects other R&D areas."

state, which operates through the constitutional intersections between scientific subjects, governmental structures and publics in those processes of regulation of risk and in the conflicts which emerge by these relations. As the authors frame their study, the controversy of the Brent Spar and, particularly in food security issues, the crisis of the BSE and GMOs controversies are symbolic and significant manifestations of the more recent developments in the relationships between scientific and governmental authorities and citizens: within scientific governance, in the UK these relationships are characterized through a visible and central problem of public concern and mistrust, and through the necessity of power institutions to construct stronger social cohesion around these controversies, in the rhetoric of the development of country, and to regain public consensus. This focus is expressed through the salience and peculiarity of the experiments of public engagement with science developed in the UK.

> (…) Among the many articulations of the British state's newfound concern for public engagement in science were a series of interventions by parliament, the executive, and the judiciary in the year 2000: the House of Lords Science and Society report; and the establishment of the Food Standards Agency, as well as inclusive standing commissions covering human genetics and agricultural biotechnology; and The Phillips Inquiry into the BSE crisis. This shift condensed around a set of practices for eliciting public views through formal techniques of "public engagement." A departure from past governance approaches, this potential space for democratizing science policy was itself shaped by British political institutions and civic epistemologies – negotiating consensus around empirical demonstrations of public attitudes (Jasanoff 2005, p. 247-271). (Doubleday, Wynne 2011, in Jasanoff, 2011 p.)

Following this perspective, the central issues which I intend to underline through the connection between Agamben's state of exception and Doubleday' and Wynne's work, is that in the recent history of risk policies, in Europe, and through different trajectories and features in national and local contexts, it seems to there be the expression of the need of 'special' processes of public participation and engagement, showing how the paradigm of scientific management of risk implies problem of democracy of policy and decision making. And these special and formal techniques for eliciting public views within an institutionalized framework, which are implemented particularly where conflicting visions between authorities and public arise, as in the UK, make visible the emergency of democratization of a political and governmental system of power increasing based on

technoscience. In this sense, I connect the affirmation of the state of emergency to forms of democratic restriction of public participation, paradoxically in the emergency of public engagement with science and, in this scope, through the reinforcement, rather, of the politico-normative role of science in policy and politics.

Following Doubleday' and Wynne's analysis, and connecting it with the paradigm of the state of emergency and necessity, these undemocratic shifts of scientific governance can assume several forms and levels of scientific despotism, and in any case they can be seen as the expression of scientistic approach of science in policy. The undemocratic character of this paradigm of government concerns several levels of explicit or more implicit alienation and/or subordination of public meanings and rationality to that of scientific authorities. In the analysis of Doubleday and Wynne the central question is to consider the historical and situated relationships between state, citizens and science particularly through those British policies which focus on the emergency of public engagement with science: the authors observe how these fields of policies can be described as the way through which social tensions and conflicts between scientific governance and citizens are played out in Britain, and as an institutional reaction to the crisis of scientific and governmental authorities' credibility and legitimacy, highlighting the problem of democracy within scientific governance.

In this dissertation this point results central because it can show the undemocratic character of policies of risk which are structured, from the perspective of this analysis, through the historical, constitutional and increasing affirmation of a scientifically-legitimated state of 'necessity' and 'emergency' (ultimately of economic development) as the paradigm of government of modern democracies (Agamben, 2004). In this perspective, the experiments of policies of public engagement with science, as the expression of the tensions between competing relationships between citizens, their meanings and representations, and scientific institutions of power, represent, rather, a visible sign of an ordinary alienation of public meanings and citizens' rationality and

concern through the affirmation of scientific governance. Nevertheless, considering the character of reciprocity of the relationships between social structures and agents, the need to reintegrate social subjects and to expand public participation, however, within the predominant structure of policy founded on mechanisms of scientific assessment and management of the GMOs regulation, can be seen as the institutional emergency to re-equilibrate the structural undemocratic disposition of decision-making based on science, and concentrated on risk and emergency issues.

Thus, through the analysis of Doubleday and Wynne, these constitutional developments of governing uncertainty and risk within contemporary democracy are described as more or less (or more or less implicitly) “despotic” or “democratic” with regard to the meaning which is attributed to citizens’ right to participate in public decisions. And I argue how the implicit or explicit affirmation of the state of emergency through the paradigm of risk governance, in Europe, can be considered as part of the wider process of reproduction of modern state, and how it produces a structural restriction of public participation, and, in its current evolution, within the reflexivity of this phase of modernity, the disposition of institutionalised dispositives and techniques of public engagement with science in the government of uncertainty.

In connection to this point, in their study Doubleday and Wynne take into account the British institutions’ reaction and respond to the articulation of divergent and conflicting understandings of citizens about GMOs issues. The expression of different meanings between citizens and scientific and governmental authorities calls questions of institutional accountability of these divergences. These different and conflicting social meanings and concerns, within the GMOs debates, become the expression of more despotic relationships between science, politics and citizens when public meanings and extra-scientific rationalities appear as subordinated to those scientific, in the affirmation of hierarchies among forms of knowledges which is profoundly involved in the reproduction of social order.

In order to describe through a situated and comparative perspective these relationships, the authors consider Jasanoff's category of civic epistemology[56] (2005), and particularly the idea of British communitarian civic epistemology[57] (Jasanoff 2005). They link this singular feature as crucial in the reproduction of particular public 'common visions' about scientific, political, social and human development, and underling how there is a constitutional affirmation of scientific model in the reproduction of public meanings. In the intersection between different cultural meanings and in the pre-ordination of the scientific culture in political decision-making, the authors highlight "tensions

[56] As I introduced in the previous sections, Jasanoff considers how citizens in modern knowledge societies are continually called to make decisions on issues which bases are structured as highly technical and scientific. In this scientific domain, social structures and citizens are represented as in need of sophisticated knowledge bases for participating in decision making. In this general representation of knowledge society, in her focus on the relationships between science, politics and citizens in contemporary democracies, Jasanoff's concept of civic epistemology contrasts the idea of universality in the relationships between scientific knowledge and the reproduction of public meanings about what is conceived as the sphere of science, introducing, rather, the notion of situated public understandings of science, through which it is possible to observe 'cross cultural variation in their perceptions of science and receptivity toward technology' (Jasanoff 2005:250). Thus, the concept of *civic epistemology,* not taking as given the authority of science, poses the question of how scientific information or knowledge comes to be authoritative in political settings, through which kinds of relationships between public meanings and representations and scientific ordinations of evidences and truths. The idea of civic epistemology recalls the attention on the reciprocity between citizens and scientific authority in the processes of reproduction and affirmation of dominant public meanings in risk controversy. In the same way, the concept of civic epistemology is proposed in connection to the study of the category of 'national political culture': applying a situated perspective to the co-production of knowledge and social orders, Jasanoff identifies interrelated dimensions in which the formation, reinforcement, crisis and affirmation or disintegration of these elements of civic epistemology occur in the simultaneous reformation of scientific authority. Thus the idea of civic epistemology has to do with the ways through which citizens are in relationships with governmental and scientific authorities and institutions. This conceptualization represents a path in order to understand different styles of public knowledge making, bases of trust and accountability, and also how (scientific) objectivity is constructed and demonstrated publically, and what (democratic and/or despotic?) relationships between scientific expertise and public knowledge found the structure of power of contemporary knowledge democracies. In these relationships, through the notion of civic epistemology the focus is on the singularity of the social context of negotiating and renegotiating of public meanings, understandings and cognitive structures through which social orders are reproduced.

[57] Jasanoff's study on the concept of civic epistemology is carried out through an analysis of national differences in the foundations of expertise in singular cultural-epistemic structures of knowledge. She observes the conjunction between expert and public knowledge reproduction in three countries (USA, UK and Germany), identifying various forms of democratic relationships and different formal qualifications of these relationships. Adapting Jasanoff's work to the arguments of this study, expertise in Britain is approached as a professional competence, but as strictly connected to the development of public national culture. In a way, in Jasanoff's idea, technoscientific expertise, in Britain, gains authority within public and political sphere, in a reciprocal relationships with public authorities, partly as if scientific culture can represent the British national governmental culture: "the expert's function is to discern the public's needs and to define the public good as much as it is to provide appropriate technical knowledge and skills" (Jasanoff 2005:268). Thus, in this sense, there is strong the idea of scientific culture, in Britain, as that (peculiar national) epistemic culture which can include and understand public meanings and through this relationship scientific voices are made authoritative in policy debates. I want to underline how this vision is not in contrast with the idea of forms of scientific despotism in this European context: as Doubleday and Wynne argue, the constitutional implications of this scientific disposition of national British culture, in regard to the level of democracy, are "in the strict sense despotic, in that there is no place for public debate about the meaning of the policy issues at stake. By 'despotic' we mean that state and scientific modes of practice in policy domains pervaded with scientific-technical dimensions increasingly assert that the *meaning* of the public issue is adequately framed by technoscience, and there are no publics who might bring different, relevant meanings and concerns to bear. In effect, citizens play a role on condition of alignment of their meanings with those already laid down by science and the state. This effectively means there is no public to be considered in defining modes of policy action or commitment – hence, *de facto*, no polis" (Doubleday, Wynne 2011, in Jasanoff 2011:'5').

between despotic and democratic constitutional commitments retain long-running 'British' [58] political cultural attributes of empiricism, instrumentalism, informality and pragmatism, aversion to models and abstract thinking ('speculation'), and of consensus by enrolling supposedly innocent publics in projects of "common vision" (Jasanoff 2005)" . (Doubleday, Wynne, in Jasanoff 2011)

From this perspective, the biotechnology revolution, particularly in agro-industrial sector, opens field of contradictions between different forms of knowledge and epistemologies in which public authorities are involved and challenged in the affirmation of their power. The achievement is the control of social contradictions and tensions, affirming shared meanings in particular on technoscientific innovation. The scientification of policy, established, legitimated and justified through the state of necessity and emergency, is that mechanism through which the contradiction are tried to be suspended. This is reached through the affirmation of a state of deference of science and technology as political agent in the pre-ordination and disposition of plausible public meaning which can be shared in the reproduction of biotechnology innovation (concerning both its definition of risks and emergency, and future benefits). Nevertheless, as it is also suggested by the reflexive approach, in the dominance of this mechanism, citizens can be involved in a process of detachment from the structures, and in any case the manifestation of their dissent represents an element of crisis for these hegemonic tendencies. This means that, as Doubleday and Wynne argue, biotechnology controversies can open spaces of reaffirmation of a stronger public participation to public policies, and a deeper recognition of political rights particularly in relation to scientific authority and scientific knowledge. In this view, contrasting the idea of passive subjectivity, citizens are, rather, conceived as social agents capable to negotiate public meanings with science (beyond the

[58] "Notwithstanding its long-established parliamentary politics, the UK state bears continuing witness to its deeply monarchist traditions, in which for example, the rights and in-grained sense of agency of *citizens* are circumscribed by their self-conscious standing as (the monarch's, and thereby *de facto* the state's) *subjects*. Although healthy traditions of truculent independence are never deeply buried, the postwar rise of science as public authority is aligned with the centralizing tendencies of the British state and a relatively passive position for its subjects. Classic manifestations of this alignment can be found not only in the case of nuclear power (Wynne, 2010), but also in other state sponsored high technologies, such as biotechnology in the 1980s and 1990s." (Doubleday, Wynne 2011, in Jasanoff 2011:'4')

information's dimension of this relationships), in the centrality that this dynamic acquires in contemporary knowledge democracies.

Thus, in the UK as well as, more in general, within the European knowledge society, conceived as that culture which founds its communitarian identity on the affirmation of the supremacy of scientific knowledge, the expressions of these public differences of meanings, social resistances and oppositions are translated into irrational elements which can undermine the development of the understanding of 'scientific' public issues: in a despotic way, extra-scientific components are expressed as less adequate forms of knowledge, especially – and paradoxically – in politics. Here, in this despotic character, can be seen the central connection between this relational forms between science, citizens and governmental authorities and the affirmation of the state of emergency as the current paradigm of government of public crises. Thus, as it is shown in the case of British GMOs policy proposed by Doubleday and Wynne, in current reforms, formations and reinforcement of scientific advice in politics, in the differentiate and situated reproduction of policies of public engagement with science, the development of several contradictions between forms of more or less despotic or democratic paradigm of government has a particular core in the kind of relationships between state government, scientific authorities and citizens. In this account, the state of necessity and emergency is founded on particular normative dimensions of these relationships. And particularly in the debates about agricultural biotechnology and GM crops and foods, considering the affirmation of cognitive and material imbalances between epistemic cultures, this disposition corresponds itself to a normative common constitutional structure of power, authority, agency and responsibility between technoscientific agents and democratic governments. These fundamental developments of contemporary democracies in systems of scientific governance and government of uncertainty appear to be dealt by forms of scientism in relation to the role of science in policy and politics.

> Developments in the twentieth century roles of science in government – developments that (…) we would call constitutional – led in the United

> Kingdom (and elsewhere) to a turn-of-millennium condition in which science had become deeply entrenched as *scientism*. Scientific advice and authority were being systematically exaggerated in regulatory control and public debate, as in the regular use of risk assessment for public reassurance as if that reassurance were based on science's full independence from policy commitments and assumptions. Further, as scientific advice took on a greater role in post Second World War public policy, it became by default not only an *informant* of public policy (its classical role), but also a powerful *cultural* agent, as arbiter of *public meanings*. This extension of science into *scientism* was not a consequence of deliberate design but rather of mutual accommodation and mutual reinforcement between policy and science as institutionalized epistemic (and hermeneutic) authority. Thus science assumed the role of authoritatively providing the *meaning* of many public issues, which came to be defined as "risk-issues" or even "scientific issues," obscuring other key dimensions. (*Ibidem*)

Thus, finally, connecting Agamben's perspective to the form of scientism suggested by Doubleday and Wynne, one point of convergence can be traced through the idea of the authors of 'exaggerated' role of science in politics and policy: in current states, science appears as the arbiter of public meanings, and this extensive role of technoscientific subjects in the formation of the dominant social definition of several public issues can be considered as a consequence of the constitutional integration and reciprocal affirmation of modern (scientific and governmental) authorities particularly in the last four centuries. In this sense, the current centrality of the processes of risk management and the increasing role of science in policy can be read jointly to the dynamics of normalization of the state of emergency: they are part of the same process of constitution of the modern states of security, where risk issues – which are placed at the centre of power's and social order's reproduction – are interpreted and managed as "scientific issues", and where this scientification of hybrid consequences of modernization has the effect of obscuring, on the one hand, all the other extra-scientific dimensions of policy, and, on the other hand, the different political, economic, social and scientific interests and commitments which are implicitly or explicitly involved in the diverse positions and decisions of policy.

Furthermore, underlining the conjunction between the process of normalization, in modern nations, of the state of emergency and the predominance of science in politics, a point of conflicting ambivalence can be retraceable in the fact that scientific uncertainty is conceived as an emergency and a situation of social risk, and not as the normal condition of scientific knowledge production. At

the same time, ambivalently, the explosion of the risks in late modernity, making visible publically that scientific knowledge reproduces uncertainty and risks, with the consequence of delegitimizing the structure of modern authorities. In a coproduced process, governmental institutions develop the necessity to redefining continually the boundaries between scientific evidences and opinions subjective positions.

Doubleday and Wynne do not mention directly the state of emergency of Agamben, but they take into account the shift, in current late modern democracies, from a government founded on scientific instruments to a form of scientific governance which has the constitutional implications of reproducing a restriction of public participation to decision making and of democracy at all. In this sense, the centrality of the paradigm of security results to be strictly connected to the idea of transformation of current democracies through the affirmation of the practices of (technoscientific) management of emergencies, risks and necessities. From this viewpoint, the link, between Agamben and the STS's analysis of Doubleday and Wynne, consists in the forms of technoscientific governance which emerge in risk policies, particularly, in the observation of the development of the biotechnology controversy in Britain, in the peculiarity of the conflicts and alliances which have emerged around the GMOs networks in UK. In this respect, Doubleday and Wynne quote Alain Irwin and his idea of governance of science in which, on the one hand, the claim of scientific consensus in political and public controversies becomes the basis of legitimation of political and governmental decisions. On the other hand, the social conflicts which arise around public risk controversy, as in the GMOs case, even though the public decision is expressed as a *science-based policy*, generate the necessity, for the (governmental and scientific) power institutions, to regain and construct public trust, credibility and social consensus.

> Alan Irwin characterizes these developments as actualizing a new governance of science in which public trust is equated with social consensus, achieved through official modes of public participation. Irwin (2006, p. 303) rightly calls for greater effort to be paid to describing these shifts in governance as forms of social experiment "symptomatic of the contemporary culture of scientific and technological change." (…) We contribute to this goal by focusing on how citizenship was reframed through this partial realignment of

> governance with respect to the science, technology, and innovation politics of genetic modification. Our central argument is that the recent history of British policy towards public engagement with science can be described as a playing out of tensions between competing versions of the place of citizens in shaping public meanings (and thus also, material trajectories) of what is at stake in a "knowledge economy." We characterize these contending versions of the capacities of citizens as "despotic" or "democratic" with respect to citizens' rights to participate in the production of "public objects." By this, we mean the extent to which technoscientific policy choices such as R&D and innovation trajectories embody tacit values established by democratic collective action (see also Jasanoff, this volume; and for a liberal democratic history of the concept, Ezrahi 1990). (Doubleday, Wynne in Jasanoff, 2011:3)

This is particularly observable within the EU and Britain contexts (differently than in Italy) where the position of the central governments of promotion to the biotechnology enterprise results to be deeply in conflict with the general opposition of national and European public opinions and citizens in respect to the diffusion of GMOs, especially, in the agro-industrial sector.

In this sense, the biotechnology policy and controversy is developed through the affirmation of a form of risk governance which seems to split in two different levels the scope of public decision: two dimensions of governance and management which are, in any case, based on the domain of technoscience in policy and politics. In this mechanisms and practices of 'scientific governance of science', through, on the one hand, the affirmation of scientific management in political and public decisions, and on the other hand, the exigency of governments to increase the level of public consensus, it is possible to retrace, the deficit democratic through which particularly the decisions in these fields of policies are taken – based on the scientification of polity – and the different national and European strategies and trajectories through which public consensus and trust are tried to be regained by the governments in crisis of legitimacy.

Connecting the paradigm of the state of emergency to this analytic approach, the structure of scientific governance and management of biotechnology policy and controversy results to restrict the space of public participation and the political dialectic of democratic decision making, reproducing forms of alienation of extra-scientific rationality, and of sub-ordination of public reasons (of resistance and concern) to the domain/reign of scientific evidences. Rather, social

conflict, public mistrust and skepticism are interpreted by scientific and governmental institutions as factors of risk for the maintenance of public order. In this disposition and exercise of power there is the affirmation of sometimes invisible and sometimes more explicit forms of scientific despotism which through the predominance of technoscience in politics, and implying the constitution of a series of sub-policies which the aim is the regaining of public trust in public authorities.

Ultimately, the character of despotism can be retraced particularly through the idea, on the one hand, of subjectivity of the necessity and emergency (Agamben 2004) which are used in order to justify the scientific domain in the management of biotechnology risk and emergency, and on the other hand, through the fact that this kind of scientific structure of decision making is based on the alienation or subordination of the different meanings and concerns which are reproduced by citizens and that very often result to be in conflict with those recognized by the states and their supporting science.

In this reign of technoscientific governance, as an extremely contentious sector, agro-biotechnology provides a representative case for the study of the results of the EU reforms. In this case the assumed remedy, designed to avoid and/or overcome regulatory conflicts, turned out to extend and reinforce the centralization of the GMOs risk assessment and management, thus basically through the re-affirmation of a model of European integration based on the superiority and universality of the scientific method of government. In effect, the history of European integration, which is characterized (in itself) as a contentious project, is deeply impregnated of the crucial role which has been assigned to EU-level advisory expertise, particularly in those functions of guide of the commercial, economic and financial strategies aimed at enhancing the cognitive authority of advisory expertise; and secondly, in order to vest of credibility the diverse diagnoses of the policy problems facing such expertise.

In the confusion of the juridical and political field of normalization of the state of emergency in contemporary European risk and knowledge society, the "Europeanising advisory expertise"[59] occurs through the reaffirmation of the 'functional separation' of the model of European integration which has linked the EU internal market with standard-setting in various ways and in several sectors, enslaving increasing the scientific enterprise in the economic-financial enterprise.

Nevertheless, the crises and the consequences of the reflexive modernization are undermining the foundation of this model of scientific functional separation and a series of food scandals, especially the 1996 BSE crisis, have destabilized official images of policy-neutral expertise at both national and EU levels. Expert advice had implicitly made policy assumptions, as if, for example, real-world practices would follow risk-management guidelines (Jasanoff 1997; Millstone and van Zwanenberg 2001). Considering the recent development in the biotechnology policy and the several conflicts which emerged in the dynamics of according national and European forms of scientific governance, and in order to address the legitimacy problems, currently the EU attempted to separate risk-assessment advice from risk-management decisions. Reorganising its scientific committees

[59] "Named after a prime architect, the 'Monnet method' envisaged a low-politics process, avoiding the most contentious issues. A few hundred Commission staff would set thousands of national experts to work at technical standard-setting, as a means to achieve an internal market (cited in Weale, 1999: 44). This project was initially seen as a technical administrative task of lowering trade barriers, also known as negative integration, but such a strategy encountered limitations. As an alternative, Europeanisation has generally meant efforts towards positive integration through a standard-setting process (Joerges, 1997, 1999). Trade barriers often resulted from member states devising their own product standards for health and safety. EU policy saw these regulations as potentially justified, unlike some national trade barriers designed to protect specialty products, e.g. beer or cheese. But attempts at mutual recognition had little success in avoiding trade barriers in the 1980s, so Commission policy sought to harmonise standards, especially for product safety issues. The relevant expertise was available mainly at national level; member states were reluctant to transfer powers concerning such politically sensitive matters to the Commission without being allowed a role in decisions. So in the 1990s the Commission sought to establish a European-wide scientific expertise acceptable to all participating national experts (Vos, 1997: 138-39). These new expert bodies advised EU regulatory committees, which in turn shared decision-making authority with the Commission. At the same time, the 1990s EU policy agenda sought to 'complete the internal market' in a more extreme sense than before. It meant recreating Europe as an artificially 'free', deterritoralised space for the smooth mobility of labour, capital and goods. This aim needed at least a mutual recognition of regulatory standards among member states through EU procedures; yet such EU competence could 'reveal differences in standards and practices across Europe' (Barry, 2001: 82-84). Such national differences have arisen even in relatively uncontroversial sectors, thus indicating an 'uneven geography of Europeanisation' (Perkins and Neumayer, 2004: 884)."

accordingly, the Commission aimed to obtain timely and sound advice, 'based on the principles of excellence, independence and transparency'[60] (EC, 1997).

That plan for expert independence was meant to support 'science-based regulation', as the global discourse which prevails in international agreements. These give EU decision-makers incentives to align their own practices with that of the WTO, especially 'by grounding their own food safety measures more solidly in a science-based regulatory approach…' This alignment aims to avoid trade retaliation, while also creating scope for precaution within WTO procedures (Skogstad, 2001: 496, 498).

In keeping risk assessment functionally separate from risk management, the EU was attempting to enhance public credibility[61]. According to an EU report on governance, regulatory responsibilities often seem blurred:

> It is often unclear who is actually deciding – experts or those with political authority. At the same time, a better-informed public increasingly questions the content and independence of the expert advice that is given (CEC, 2001: 19)

This general problem has divergent diagnoses, each with a corresponding to an institutional remedy. According to the dominant diagnosis, regulatory procedures may lack of public credibility if advisory expertise involves disagreements, subjectivity, policy influence, etc.; as the corresponding remedy, the EU should harmonise expertise so as to provide consensual objective advice[62]. According to alternative diagnoses, however, narrow expertise poses a problem:

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[60] "To pursue those aims, in 1997 all the expert advisory committees were transferred to DG 24 for Consumer Affairs, later renamed DG-SANCO. Formerly the relevant committees were hosted by the Directorate-General responsible for the corresponding legislation. The new arrangement was formalised as a policy: 'experts responsible for scientific risk assessment should be kept functionally separate from those responsible for risk management' (e.g., EU Council, 2000). Formerly, governments had nominated prospective members of the committees; now such individuals were invited to nominate themselves for consideration and were asked to declare any material interests, e.g. sources of research funding, in an effort to enhance expert independence".

[61]

[62] The former diagnosis prevails in documents from the European Commission, its scientific advisors and some policy analysts. Alternative diagnoses come from some Commission staff members and EU-funded reports. By analogy to those divergent remedies, knowledge-production in the European Environmental Agency has a tension between two models: Europe as an emerging superstate needing harmonization across cultures, versus Europe as a civil society evaluating uncertainty and contingency (Waterton and Wynne, 2004: 91-92).

> While being increasingly relied upon, however, expertise is also increasingly contested…. 'Traditional' science is confronted with the ethical, environmental, health, economic and social implications of its technological applications (Liberatore, 2001: 6).

Thus, the recent EC tendency, which is at least partially in conflict with the dominant paradigm of governance of security[63], goes toward, on the one hand, the attempt to open the European legislative framework to extra-scientific grounds (ethical, environmental, health, economic and social implications) of legitimated of the several state oppositions and resistances to, particularly, GM crops in national territories. On the other hand, the diagnosis for the deficit democratic and the crisis of legitimacy and credibility of scientific and governmental European and national institutions of power has been identified through the idea of pluralizing the expertise and incorporate[64] various dialectical and conflicting forms of knowledges and meanings within formal procedures[65].

Nevertheless, currently the model of one Science, with the capital S predominates within the European boundaries of regulation, and one unique centralized model of regulation based on science is prevailing, still in the exigency of harmonisation among member states. These exigencies are producing the formation of power strategies aimed to regain public confidence through the reformation and/or reinforcement of 'independent' expert advice, somehow standing above policy. At this regard, according to the European Commission, the establishment of EFSA was 'generally regarded as the most effective way to address the growing need for a solidly science-based policy and to increase consumer confidence' (EU Food Law News, 2000). The EFSA structure was aimed 'to protect the scientific integrity of expert advice'. According to this perspective, the independence

[63] EFSA was intended to link scientific objectivity with public credibility and regulatory harmonisation, through a positive integration of national regulatory criteria. According to the new legislation: 'In order for there to be confidence in the scientific basis for food law, risk assessments should be undertaken in an independent, objective and transparent manner, on the basis of the available scientific information and data'. A related aim was to harmonise regulatory criteria, even precaution: 'it is necessary to adopt a uniform basis throughout the Community for the use of this [precautionary] principle', which 'has been invoked to ensure health protection in the Community, thereby giving rise to barriers to the free movement of food or feed' among EU member states (EC 2002a: 2).

[64] "[Decision-making needs] … expertise that embraces diverse forms of knowledge (plurality). Expertise should be multidisciplinary, multi-sectoral and should include input from academic experts, stakeholders, and civil society (ibid:3). [It needs] a 'track record', explaining how evidence was produced and used, including accounting for minority views and making explicit the uncertainties" (ibid: 20).

[65] This is particularly visible in the case of Britain: "".In this sense, advisory procedures are observed as part of the mechanism of power reproduction and they are conceived as measures to develop "an approach that makes apparent the possibility of unforeseen consequences, to make explicit the normative within the technical, and to acknowledge from the start the need for plural viewpoints and collective learning" (Nowotny, 2003: 153).

of EFSA 'will ensure that scientific risk assessment work is not swayed by policy or other external considerations'. Moreover, 'the Authority's reputation for independence and excellence in scientific matters appertaining to food will put an end to competition in such matters among national authorities in the Member States' (Byrne, 2002: 4-5). Thus, when EFSA communicates its results, 'the information will be objective, reliable and easily understandable for the general public' (CEC, 2002a).

While we can observe a functionally separation between risk assessment and risk management, the new structure was also designed to link those roles at a policy level. A Management Board would include representatives from the four spheres of the agro-food chain, as farmers, food producers, retailers, consumers. An Advisory body, as EFSA, was expected to draw upon various national strengths in expertise, consider the diversity of agro-environmental conditions, judge the quality of evidence and thus consider all relevant uncertainties within risk-assessment procedures. In the establishment of EFSA, the European Commission found trans-European institutional partners with shared understandings of policy problems, especially the need to gain public confidence. Thus, one important shift, in the development[66] of this field of regulation, is that these new arrangements

[66] In this way, the EU sought 'an overall commitment to a stronger "top-down" and standard European approach to both the assessment and management of risks', as a means to harmonise both those roles at the EU level (ibid: 563). As a specially contentious issue for the EU, agro-biotech regulation has undergone pressure for greater precaution and harmonisation, especially since the late 1990s. At the June 1999 meeting of the Environment Council, many national Competent Authorities (CAs) had declared that they would not consider further requests for commercial authorisation of GM products until new conditions were fulfilled: 'Given the need to restore public and market confidence', the EU must first adopt new measures – e.g., full traceability and labelling of GM crops across the agro-food chain, and risk-assessment criteria which are more transparent and based on precaution (FoEE, 1999: 3). In addition, some member states banned GM products which had already gained EU approval. Through this *de facto* moratorium, the EU level regulatory procedure was effectively suspended. The suspension drove EU policy towards a more explicit treatment of scientific uncertainty. The 1990 Directive on the Deliberate Release of GMOs was revised along more stringent lines, with the precautionary principle in its preamble. Henceforth risk assessment must encompass a broader range of potential effects; and potential risks may not disregarded simply on grounds that they would be unlikely (EC, 2001). For implementing the Directive, expert guidance set relatively more stringent criteria for evidence, e.g. the quality necessary for a peer-reviewed journal (SSC, 2003b). In the same period, the Commission gained support for proposals to centralise regulatory decisions and expert advice. It had long promoted the slogan, 'one door, one key', i.e., a single procedure for authorising a GM product for all commercial uses at once. Under the 2003 GM Food & Feed Regulation, which replaced previous laws for GM agro-food products, EFSA centralises the administrative procedure for circulating product files among member states and for checking applicants' risk assessments. EFSA was asked to standardize evaluation criteria across member states: 'In order to ensure a harmonised scientific assessment of genetically modified foods and feed, such [risk] assessments should be carried out by the Authority [EFSA]' (EC, 2003: 4). This remedy largely means harmonising expert advice through 'science-based' regulation. Amid continuing conflict over agro-biotech, the Commission proposed a 'strategic vision' for biotechnology. In its view, regulatory oversight 'is the expression of societal choices' – through rules which ensure that market mechanisms function effectively through for

involved a wider range of EU-level stakeholders, considering crucial consumer groups and citizens at large.

This series of violations regards different levels and interconnected planes of democratic systems: in Italy, for example, where the government has expressed a position of "zero-tolerance" to GMOs, the violations are identified, particularly by European institutions, in terms of non-adherence and opposition to the scientific management and measures developed by the European authorities. In this case, as I try to explain in the comparative analysis, the state of exception is expressed particularly by the extensive use by the Italian government of the emergency instrument of the decree through which the GMOs policy has been developed in Italy. As Agamben argues, the decree[67] is one of the most important instruments of government under the state of exception. Within the Italian territory the emergency and necessity which have dealt the Italian government to use this instrument is the risk of contamination from GMOs that is supposed and affirmed, generally, on the basis of the insufficiency of scientific evidences which can allow the diffusion of GM products in the environment. This position has been considered in opposition to the current normative previsions of law in Europe[68], where a series of GM products are legalized on the basis on the authorizations coming from the EFSA's system of biotechnology risk assessment and management. Thus, within the controversial relationships between the national and European systems of the GMOs regulation, the Italian paradigm of government in biotechnology sector has been very often explicitly declared as a form of emergency management of the GMOs risk.

> (…) the progressive erosion of the legislative powers of Parliament, which are today frequently limited to ratifying decisions made by the executive in the form of decrees with the force of law, has become since [the creation of the totalitarian states during World War I] common practice. (…) One of the

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consumer preferences (CEC, 2002b: 14, 15). Overall its policy aimed 'to enable Community business to exploit the potential of biotechnology while taking account of the precautionary principle and addressing ethical and social concerns' (CEC, 2003: 6, 17). By putting a great burden on 'science-based regulatory oversight', this framework raised the stakes for official accounts of science and precaution.

[67]

[68] "Some Member States vote against the opinion of the independent safety assessors for political reasons. Nonetheless, since 2010, a majority of votes (more than 50% of available votes) cast by Member States in authorisation votes favoured authorisation. A minority of countries that represent less than 30% of the votes is slowing approvals by voting against the scientific opinion"…

> essential characteristics of the state of exception – the temporary abolition of the distinction between legislative, executive and judiciary power – shows here its tendency to become a lasting practice of government (Agamben 2004:19).

I suggest that where the (modern) distinctions between legislative, executive and juridical power result confused, in the crisis of contemporary capitalist democracies, the state of emergency finds its constitutional legitimation on the basis of the affirmation of the scientific management of risk, crisis, and decline and of the several consequences of the processes of reflexive modernization. This scientific domain in politics and policies represents the paradigm of government which rules in the situations of current crises, and it seems to have the effects of reproducing public alienation from political decisions, and the exclusion of any extra-scientific element from the main arenas of decision making. This restriction of democracy occurs with different (political) results and within diverse relationships between science, politics and citizens. In any case the affirmation of the practice of government supported by

Considering the character of subjectivity of these conceptualization, in Britain the necessity and emergency are expressed, in line with the European framework, in a very ambivalent way – which constitutes also the general rhetoric through which the biotechnology debate is developed in the different political arenas in the international and nationals contexts: on one hand, necessity and emergency are identified, by the most important British scientific societies and by the governmental authorities, in terms of the urgency of developing biotechnology innovation, particularly in agro-industrial sector, in order to avoid the risk of political, economic and social underdevelopment caused by an eventual choice against the GMOs enterprise[69]. Nevertheless, the public opposition to GMOs has constituted in Britain the real trouble, for the government, in the development of this policy and this innovation in its different fields of application. Public resistance and social conflicts in Britain against the scientific, political, economic management of the GMOs issue have generated the necessity of establishing a series of sub-fields of policies through which the attempt of the government and scientific institutions has been to regain public trust and find public consensus

[69] Blair and Royal society..

about the GM debate. This mechanism shows how collective trust is conceived as public consensus[70] achievable through the predisposition of institutional channels of public participation to this kind of 'scientific' decisions, which are, in any case, defined by European and British government as science-based policy in the technoscientific domain of risk assessment and management. This form of government does not represent an extraordinary measure, rather it is the product of the constitutional relationships between science, politics and law, in the affirmation of technoscientific dispositives and practices of state administration and management.

> The true mystery of western politics is not the state, not the constitution, not sovereignty, but government. As the state of exception becomes the rule, it is shown to be much more a technique of government than an extraordinary measure. (Agamben, 2004: 18)

By the comparison between the Italian and British use of the state of emergency and necessity emerge Agamben's idea of partiality and subjectivity expressed by the affirmation of the state of emergency and necessity: in Italy the state of emergency is declared on the basis of the necessity of intervening in order to avoid any contamination from GMOs; in Britain the state of necessity is expressed by the double urgency of founding the policy fully on the basis of scientific evidence (considering the national context of crisis particularly in food issue, after the case of the BSE), and the need of reproducing experiments of public understanding of science and public engagement with science with the end of approaching citizens to science in politics.

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Case study and trajectories of research: the GMOs controversy and regulation in the comparison between Italy and Britain

The regulation of GMOs in Europe and, from a comparative perspective[71], between two European countries and EU member states, Italy and Britain, is the case study of this research.

So far I introduced the theoretical perspectives through which I explored the relationships between technoscience and politics within public sphere, in the dynamics of development particularly of the GMOs risk regulation considering the interconnections between national political cultures and their singularities in the reproduction of this field of public debate: this case study is taken as representative of those policies defined as based on science; moreover, in the comparison between Italy and in Britain, the main shared element between the two countries on which this comparison is constructed is the common European regulative background. Within the European knowledge society, and among European "*sociotechnical imaginaries*"[72], which are defined in this research as "*imagined forms of social life and social order that center on the development and fulfillment of innovative scientific and/or technological projects*"(Jasanoff, Kim, Sperling 2007) the GMOs regulation, within STS literature, represents a case study particularly explored (Wynne 2006; 2011;

[71] "*The comparative accounts (…) develop and expand upon three major arguments (…). The first is that democratic theory cannot be articulated in satisfactory terms today without looking in detail at the politics of science and technology. That contemporary societies are constituted as knowledge societies is, of course, an important part of the reason. It follows that important aspects of political behavior and action cluster around the ways in which knowledge is generated, disputed, and used to underwrite collective decisions. It is no longer possible to deal with such staple concepts of democratic theory as citizenship or deliberation or accountability without delving into their interaction with the dynamics of knowledge creation and use. More specifically, biological science and their applications have brought about ontological changes and reclassifications in the world, producing new entities and new ways of understanding old ones. (…) Unexpected innovations in administrative and judicial practices, forms of citizen participation, and discourse of public persuasion happened around genetics and related areas of science and technology. (…) The (…) second major argument is that (…) policies concerning the life science have become embroiled to varying degrees in more or less self-consciousness project of nation-building or, more accurately, projects of reimagining nationhood a critical juncture in world history. (…) The (…) third argument, not unrelated to the second, is that political culture matters to contemporary democratic politics. (…) There are persistent differences in national ways of meeting common economic and social changes (…). Comparative studies if science and technology policy today need a different justification than simply the propagation of improved managerial techniques. (It is) the case for a new kind of comparative analysis – one that retains nation states as units of comparison but is organized around the dynamic concept of political culture, rather than the more static categories of political actors, interests, or institutions. My aim is to explore the links among knowledge, technology and power within contemporary industrial democracies and to display these links form the standpoints of those situated within particular cultures of action and decision. This approach illuminates how political culture plays out in technological debates and decisions – most particularly how it affect the production of public knowledge, constituting what I call the civic epistemologies of modern nation states*". (Jasanoff, 2005, pp.6-15)

[72] *Sociotechnical Imaginaries and Science and Technology Policy: A Cross-National Comparison*, Sheila Jasanoff, Sang-Hyun Kim, Stefan SperlingProject; 2007. Jasanoff, Design on nature. Science and democracy in Europe and the United States, 2005, Princeton University Press. This concept, as Jasanoff argues, has to be read jointly with her perspective of coproduction's processes of normative knowledge analysed in the previous parts.

Bucchi, Neresini, 2006): this case study can be seen as a window through which to observe the development of these imagined forms of the ordering of society through the ordering of life sciences, in the more recent revolutionary biotechnological scenario of genetically manipulation of life.

Through this specific and high representative case study, in this research the attempt is to highlight, throughout a crossed focus on several STS studies and arguments, the differences and similarities between democratic political cultures in the processes of reproduction and definition of risks, ends and benefits of biotechnological innovation, and the several ways in which political and social frictions, conflicts and challenges, that are reflexively implied in this innovation's processes, are institutionally faced, as they arise simultaneously as problems of democratic participation, in the domain of expert advice, and as ethics and accountability questions.

Within the European knowledge society, the normative practices and activities of normalization of genetic engineering and biotechnological products represent a very useful and typical case in order to focus the attention on those *imagined forms of social life and social order that center on the development and fulfillment of innovative scientific and/or technological projects*: on the level of public imaginaries, as well as in the material reproduction of instruments, dispositives, structures and dynamics of regulation of technoscientific risk, through the normalization of the processes of biotechnological manipulation of life, forms of modification and creation of social imaginaries and forms of adaption and continuous re-arrangement and adjustments of social orders are implied, which are already particularly centered on the idea of technoscientific development and progresses as the principal achievement of social, economic, national and human future improvement. Thus, while considering the highly technoscientific treatment of risk, and particularly in the GMOs policy, of power institutions of different state nations and supranational entities, irreducibly the idea of human 'improvement', as well as that of risk, recalls immediately the sphere of moral and ethic of individuals and societies; and the connotation of *future* development and benefits confers to these

sociobiotechnological representations not just a descriptive, but also a prescriptive dimensions to the processes of innovation and social change. In this sense, through the account to the processes of affirmation of GM products within the structure of power and in public debates of the European knowledge society, it is possible to observe the normative dimension of power which emerge through the relationships between science, politics and public; and how, in the deepest and constitutive meanings and representations of European community's edification, there is strongly the connotation of an *imagined community* (Anderson, 1983) founded upon the idea of technoscientific development and progress as the primary sign of the supremacy of European democracies among 'civilized' cultures.

Following this idea of the European knowledge society as that community in which the center is imagined upon the technoscientific development and progress, this last is conceived as the most important achievement for the improvement of the course of life among European populations (but in a wider sense, universally and for humanity). In these terms, in this dissertation, biotechnological (sociotechnical) imaginaries, as an influential part of the contemporary European politics and of European identity's construction, through the linked focus on the coproduction processes of normative knowledge, are interpreted as a sort of visible sign of the invisible power which is reproduced through the affirmation of particular model of human development and progresses, in which technoscience is conceived at the centre of both the production, assessment and management of the processes of innovation, and in the construction of these imaginaries, where are implied: "*the power to shape technological design, channel public expenditures*", and justifications of "*the inclusion or exclusion of citizens with respect to the presumed benefits of technological progress*" (Jasanoff, Kim, Sperling 2007).

Thus, considering the theoretical approaches through which I defined the field of investigation of this research, and taking into account the GMOs controversy as a salient case study in the observation of the reproduction of these so determinant sociotechnical imaginaries, I developed this

analysis particularly focusing on the dimension and rhetoric of risk and disorder imagined as implied in the GMOs policy, and on the ways in which (national and supranational) power institutions try to regain the firmness of their structures in relationships to citizens' and social agents' mistrust and skepticism which arise, generally and diffusely, through risk controversies, particularly for their reflexive connotation. This means that, considering the imaginary of biotechnological innovations within the European knowledge society as a matter of political power, reflexively, problems and concerns about risks arise, as in any other socially relevant process of innovation and change, together with social frictions and elements of instability of social order. Thus, in this framework, the question is how these dynamics of the GMOs regulation, in different national political cultures, come to be formed and implemented within global dimension of risk and uncertainty, and in the crisis of legitimacy and democracy of modern power structures.

Reconstructing the theoretical background of this research, I partly introduced the analysis on the European normative structure of the GMOs regulation, particularly in the last three decades, and in relation to the two national case studies. Thus, in order to frame the case study, in the Italian full version of this dissertation, I tried to reconstruct the GMOs case study, starting with the reconstruction of this debate and policy at the European level, as common background of the two countries in comparison. It is necessary to consider also the international and global dynamics of economic, political, scientific and juridical context in which GM products are currently regulated and put in circulation. As I have already underlined, in this study I particularly focused on the dynamics of the regulation of GMOs risk in the agro-industrial sector of biotechnological development. Through the analysis of the two national cases studies, I defined the dimensions of comparison, trying to elaborate them in consideration to the different cultural contexts and particular contingents, which constitute the cognitive and material terrain on which the GMOs policy in Italy and Britain has been developed; and also framing the comparative research through the common European scenario of GMOs regulation.

In this sense, I organized thematically the development of the GMOs case study along several dimensions, including: *a)* dynamics of decision making: through the analysis of the position of the Italian and UK national governments in the policy of GMOs (pro or against – in the dichotomous and dualistic model within which the decision is made); *b)* dynamics of policy making: focusing particularly on the relationships between technoscientific structures and subjects and political institutional agents of national governments in public sphere; *c)* the dimension of power legitimacy and relating to the level of democracy of this policy: focusing on the relationships between national institutions and structures of the GMOs regulation (including here both political and scientific subjects) and citizens within public sphere of biotechnology policy; *d)* local and global-supranational dynamics of the GMOs regulation: focusing on the relationships between national and local level of normalization of GMOs and within the normative European background.

All these dimensions are structured on the basis of the particular interest of this research of exploring from an international to a local levels the relationships between power and knowledge, considering the representativeness of the GMOs case study particularly in the ways in which institutional regulators face the reflexive dimensions of risk and social frictions which emerge in the development of biotechnological imaginaries, within different national political cultures. These are constituted, through long-period dynamics of construction of modern scientifised social orders, by situated relationships between political and scientific structures and agents and between these structures and citizens, in the co-production of national social orders.

Secondly, after the reconstruction of the common international framework and interpretative theoretical model of research, I aimed to compare, through the dimensions just identified, the Italian and Britain processes of the GMOs risk regulation, drawing similarities and differences in the normative disposition of those coproduced forms of knowledge which act as visible and very often invisible instruments of political and governmental power in the social ordering of biotechnological innovation and GM imaginaries.

In this research I used the set of qualitative and interpretive methods of social sciences, which integrate approaches of policy analysis, juridical categories, and from history and sociology of science. By the integration of all these qualitative and interpretative methods and instruments, this comparative analysis on the case of the regulation of GMOs follows these directions of research:

- How social, political, scientific and economic commitments, within different national political cultures, are involved and interdependent in the coproduction of specific and situated national trajectories of technoscientific development; and how these directions of technoscientific innovation, through the actions and commitments of several cultural agents and structures, deal with the framing of social and political orders.
- How the processes of justification and legitimation of the GMOs policy and decision making, in both national contexts and in the EU, occur, particularly in relation to the dimension of the regulation of risk which is implied in the GMOs controversy; and how these dynamics of legitimation of science and technology policy of risk, even if they seems to be sustained in both national political contexts through the scientification of polity, they can produce different short-terms results of policy and decision making.
- What are the implications of the dynamics of scientification of the GMOs policy on the democratic systems of power, considering these processes of normalization of life manipulation as a coproduced reordering of democratic structures, concepts and material definition of citizenship, political participation to public policies and decisions, along the developments of particular kinds of space of social change and innovation.
- How the connotation of reflexivity of the GMOs controversy and risk implications of the spread of GM products into the environment constitutes an element of social friction and reflection which put in crisis the national and supranational systems of regulation of biotechnology policy; and how these implications takes different forms on the basis of the various relationships between political, scientific, economic and social actors within diverse situated public sphere and national and local cultures.

Considering these directions of investigation, the comparative analysis of the GMOs policymaking and biotechnological imaginaries in these two European countries is founded simultaneously on this common regulative supranational background, and also on the constitutional and constitutive differences which I summarised starting the analysis from the divergent governmental position of Italy and Britain in the dichotomy pro or against GMOs, that represents the polarized debate through which biotechnology controversy has diffusely been developed. On the basis of these differences the comparison leads two diverse forms of social impact, democratic implications and social conflicts.

On the case study: why a comparison on the biotechnology policy within the European knowledge society?

Biotechnologies have been, probably, one of the most controversial questions in the last three decades, within the sphere of the relationships between science, technology and society (Bucchi, Neresini, 2006; Wynne, in Bucchi, Neresini, 2006). Among other technoscientific policies, the GMOs controversy has diffusely characterized the public debate in Italy, in Britain and, in general, at a European and global level, triggering very often sharp social conflicts between several agents and subjects which are involved in the different public arenas of policy, in diverse national and supranational political cultures.

Biotechnology issues, within STS debate, has captured the attention of several scholars and analyses for the high representativeness of this case of the most recent and deepest developments involving the role of technoscientific research and innovation in the juridical and political ordering of contemporary societies. The high representativeness of the GMOs case study is expressed by the facts that ‘every’ kind of issue of sociological interest, in relation to the study of technoscience and society, is deeply involved in the reproduction of biotechnological debates and policies: the role of scientific expertise and advice in policy and politics, media influences in the construction of public discourses and sociotechnical imaginaries, the crucial question of risk assessment and management, the issues about the public participation to technoscientific policies and decisions, relating, thus, to

the development of particular forms of public understanding and engagement with science, in the risk of incrementing of the diffusion of public mistrust, skepticism and social frictions. Every crucial node of science and technology studies is encouraged and stimulated by the observation of biotechnology and GMOs policy. This is mainly because the GMOs controversy is characterized as a hybrid issue (Latour, 1995), which means that it can be explored, understood and framed just through an intersectional perspective that aims to connect the different components, positions, agents, structures, instruments, mechanisms, dispositives, long the chain of social f-actors, involved in the coproduction of biotechnology order: technological apparatuses, scientists, experts, policy makers, capitalist companies, activists, citizens, consumers, patients.

Thus, following the description and analyses emerged within science and technology policy's debates, I select the biotechnology and GMOs controversy as that technoscientific policy which configures the case study of this research because of:

a) its focus on *risk* issues: the GMOs public debates and policies, across European nations, has been developed constituting their central connotation as a technoscientific processes of risk assessment and management;

b) its expression as *global* controversy, which have to be faced through economic-technoscientific-politic integrated systems of normative knowledge that act extensively from the supranational to the national and *local* level of public technoscience comprehension and regulation;

c) its connotation as *hybrid* and *reflexive* products of current processes of modernisation: GMOs and biotechnology appears as the result of the integration-hybridisation, first of all, between technology and science; between 'natural' rules of life's reproduction and human intervention; and between technoscientific and capitalist enterprises. The meaning of nature, life and possibility of human intervention and manipulation are reframed through the development of biotechnology and GMOs innovation. These processes – as one of the last deepest dynamics of modernization – are

characterized by irreducible elements of reflexivity which put in crisis the democratic system of regulation of biotechnology policy: particularly the connotation of risk issue confers to the GMOs controversy the idea of continuous social, institutional and power self-confrontation with the implications, risks and consequences which can arise through the development of biotechnology innovation.

The salience of risk issue in the biotechnology and GMOs controversy represents, thus, the element which makes this field of policy as a very representative case in the study of the constitutive and relational dynamics between knowledge and power in the ordering of societies, in circumstances, situations and backgrounds of uncertainty, emergency and crisis. The definition of risk policy, within the European knowledge society, represents the basis of justification of technoscientific assets of the biotechnology and GMOs policy: this means that the processes of scientification of public arenas, within different European national and local contexts, are strongly reinforced by the development of GMOs debate as a risk issues, in the *a priori* connotation of biotechnology as a science and technology policy for the high technoscientific content embedded in biotechnological products. Thus, risk connection of the GMOs policy and debate is emphasized, in this research, because through this feature this policy results to be explicative of the constitutive, relational processes between the reframing of knowledge and social orders in the crisis of modern models of development and progress, and on the constitutional and democratic implications of the institutional affirmation of scientifised states of emergency which in order to face risk and crisis of this phase of modernity.

These coproduced dynamics of change, re-adaptation and maintenance of social orders in times of crisis, through the processes of biotechnological innovation, take place on a global dimension, as well as, from a global to a local level, through the diffusion of scenarios of risk embedded in GMOs public debates, which, as in Beck's description of late modern risk, are imagined and perceived for their global diffusion and materialization, as factors of explosive contamination of dangers and

hazards, across nations, deriving by the radicalization of the dynamics of modernization. Considering these kinds of limitless risks, through the GMOs case study it is possible to obverse how in different supranational, national and local contexts the relationships between knowledge and power, in current globalizing late capitalist democracies, give form to several social reorganization, conflicts and alliances between the various social actors situated on this global trajectory of biotechnological innovation and development.

At this regard, the global background of the GMOs processes of risk regulation has to be considered, on the one hand, in the light of the role of the WTO[73] and its political management of GMOs, particularly in agro-industrial sector, which is endorsing the development of this technology as a new 'green revolution' for world populations, and minimizing the risk involved in biotechnological processes considering, rather, GM products as the equivalent of other non genetically modified materials. The European and international history of GMOs, as hybrids products of late modernity, cannot be understood, if we do not consider this supranational management of GMOs and how a series of international pressures are constitutive in the construction of the EU[74] adaptation and more recent promotion of the development of the global and European biotechnology market and trade. Moreover, in order to frame this comparison, it is worth underling some common elements in the GMOs regulation which are shared both at the international and local level of the GMOs controversy. Firstly, within the WTO and in the EU, and, in the same way, considering the different and subjective challenges for the national governments, it is possible to note a dynamics of convergence in the affirmation of states of the emergency and

[73] Grant E. Isaac & William A. Kerr, *Genetically Modified Organisms at the World Trade Organization: A Harvest of Trouble*, 37 J. WORLD TRADE 1083 (2003); Christian Joerges & Jürgen Neyer, *Politics, Risk Management, World Trade Organisation Governance and the Limits ofLegalisation*, 30 SCI. & PUB. POL'Y 219 (2003).

[74]Considering the international controversial framework of the relationships between the EU regulation of GMOs and the implementation of this policy within economic and political global agendas, and particularly the problematic relationships between EU and WTO arenas of GMOs policy, it can be worth précising here the fact that, even if the EU became a WTO member state since January 1995, within this international institutions it is recognized "officially as the European Communities in WTO business." World Trade Organization, Member Information: The European Communities and the WTO. http://www.wto.org/english/thewto_e/countries_e/european_communities_e.htm. The *Biotech Products*dispute arises from regulatory actions taken by the EU. Following these different wording, in this dissertation I refer to the EU definition for describing the official European actions, and to European Communities (EU) when I'm considering the official document of the WTO.

necessity which dominate in the processes of construction of public legitimation and justification of policies and decisions on several levels of public arena (from the international to that local).

Furthermore, in general the strong connection between private and economic interests and the development of biotechnology increments the attitude of public mistrust: biotechnology networks appear as constructed at the core of the activities of big multinational enterprises, which operate particularly in drugs and food production and distribution, through global channels in worldwide markets, with their private capitalist interests in investing (or not) in this sector of innovation. The constitution of these hybrid forms of laboratory-factory's products, which can find their full realization directly into the environment and in their field of application, is increasing embedded within multinational capitalist enterprises and incorporated in supranational and state structures of governments. In this panorama, through the comparison of European GMOs debates I also considered the social action of NGOs and the dimension of social resistance to these products, in connection with the action of those networks of international movements – *Green peace, Friend of the Earth, Ya Basta* – with national and local bases, which dislocate their acts transversally and, in 'any' place, opposing their political line to the several directions of policies constituting the global agenda of capitalist development (as for example the implementation of biotechnology and GM products, particularly in agro-industrial sector; nuclear power issues; and, in general, about the establishment of all those big industrial and technoscientific enterprises which are perceived as dangerous and as agents of risk, pollution, natural and environmental disasters).

Focusing particularly on the European context of the GMOs regulation, within the international and global dynamics of development of biotech products, and with specific regard to the agro-industrial sector of application, this issue has been characterized as one of the most intricate and controversial fields of global policy, where the increasing contrapositions between several extra-European countries and the EU, in the promotion of biotechnological products can be observed as a very representative example of the conflicting ways in which global political and economic agendas and

particular models of development and progress are reinforced through international channel and instruments of power and political control, and how these processes are faced and framed in different national and local contexts.

In effect, the recent history of the GMOs controversy in Europe is emerging in a context of international pressures respect the precautionary position of the EU and the high levels of skepticism among population's of European member states. The connotation of public global controversy of the GMOs policy takes particularly relevance if we consider the international dynamics in which, in August 2003, the United States, Canada, and Argentina have initiated sanctioning procedures, around the table of the WTO, against the EC for delaying approvals of GM crops within its borders. Previously, on the 14th May 2003, the United States, Canada, and Argentina, in a consultation called for debating about the European *ad hoc* moratorium on GM crops which were already authorized out of the Communitarian boundaries, have invoked the constitution of a panel in order to acquire the necessary information and initiate the dispute[75].

In this dispute are not just involved technoscientific contents and concerns relating to the regulation of the commercialization and trade of GM products; rather, this controversy is engaging questions of national sovereignty, democratic participation[76] and policy and decisions making processes within international institutions and arenas, as the WTO. The development of these kinds of international hybrid controversies and disputes concern different types of political, economic and

[75] Permanent Mission of the United States to the Chairman of the Dispute Settlement Body, *European Communities – Measures Affecting the Approval and Marketing of Biotech Products: Request for the Establishment of a Panel by the United States*, WT/DS291/23 (Aug. 8, 2003); Permanent Mission of Canada to the Chairman of the Dispute Settlement Body, *European Communities – Measures Affecting the Approval and Marketing of Biotech Products: Request for the Establishment of a Panel by Canada*, WT/DS292/17 (Aug. 8, 2003); Permanent Mission of Argentina to the Chairman of the Dispute Settlement Body, *European Communities – Measures Affecting the Approval and Marketing of Biotech Products: Request for the Establishment of a Panel by Argentina*, WT/DS293/17 (Aug. 8, 2003).

[76] As Winickoff, Jasanoff, Busch, Grove-White and Wynne (2005) suggest, this particular theme – legitimacy and democracy in international trade law – is developed in the analyses of: J.H.H. Weiler, in *The Rule of Lawyers and the Ethos of the Diplomats: Reflections on the Internal and External Legitimacy of WTO Dispute Settlement*, 35 J. WORLD TRADE 191, 193 (2001) (acknowledging that political legitimacy has become "an essential part" of international trade law); ROBERT HUDEC, *Concepts of Fairness in International Trade Law*, *in* ESSAYS ON THE NATURE OF INTERNATIONAL TRADE LAW 227 (1999); Robert Howse & Kalypso Nicolaïdis, *Legitimacy and Global Governance: Why Constitutionalizing the WTO Is a Step Too Far*, *in* EFFICIENCY, EQUITY, AND LEGITIMACY: THE MULTINATIONAL TRADING SYSTEM AT THE MILLENNIUM 227 (Robert B. Porter et al. eds., 2001).

social implications and consequences both for the global and national and local development of agro-industrial sectors, for the reflexive dimension of risk which is implied in biotech innovation, and thus, within this processes of risk management in global trade and market, for the effective level of democracy and legitimacy of international, regional, national and local institutions of power and regulation.

From this controversial and complex background, it emerges how at the center of the GMOs issue and policy there are, formally, this directional development of biotech regulation which consists into the technoscientific and juridical establishment of a global governance of GMOs risk[77]. Risk management[78], as it is framed through this kind of technoscientific controversy, represents a very crucial expression defining and supporting, compressively, several directions of innovation market and trade, with particular regard to the GMOs policy, in food production and distribution which are regulated within the science-based model and discipline of risk policy of international institutions as the WTO. The definition and promotion of model of global risk management, if we look at the field of GMOs innovation within international arenas, revels the dominant preexistence of processes of legitimation through the scientification of political decision and policy making in those knowledge societies which are already centered on particular model of technoscientific development and

[77] As the U.S. and other states vs. the EU moratorium shows, "*the central legal issues in Biotech Products involve the interpretation of important provisions of the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), especially those portions concerning 'scientific justification' and 'risk assessment'*" (Winickoff, Jasanoff, Busch, Grove-White, Wynne, 2005, p. 82). This agreement has been endorsed, in the spring of 1994, as a constitutive part of "*the agreement establishing the WTO, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) covers and restricts the laws, regulations, and other measures that WTO members impose in efforts to protect against food and plantborne threats to animal, plant, and human health*". Agreement on the Application of Sanitary and Phytosanitary Measures, Apr. 15, 1994, Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, Annex 1A, LEGAL INSTRUMENTS – RESULTS OF THE URUGUAY ROUND vol. 27, *available at* http://www.wto.org/english/docs_e/legal_e/15sps.pdf [hereinafter SPS Agreement].

[78] Permanent Mission of the United States, *First Submission of the United States in European Communities – Measures Affecting the Approval and Marketing of Biotech Products*, WT/DS291, 292 & 293 (Apr. 21, 2004) [hereinafter *First U.S. Submission*]; SPS Agreement, *supra* note 4, art. 5.7 (allowing member states to impose provisional SPS measures "where relevant scientific evidence is *insufficient*," but requiring that such members "seek to obtain the additional information necessary for a more objective assessment of risk and review the [SPS] measure accordingly *within a reasonable period of time*"); *id.* art. 5.1, 5.4 (WTO members shall evaluate their SPSmeasures "taking into account *risk assessment techniques developed by the relevant international organizations*. . . . With the objective of achieving consistency in the application of the concept ofappropriate level of sanitary or phytosanitary protection against risks to human life or health, or toanimal and plant life or health, each Member *shall avoid arbitrary or unjustifiable distinctions* in thelevels it considers to be appropriate in different situations, if such distinctions result in discrimination ora disguised restriction on international trade").

progress: risk management is an expression for describing those political and economic situations in which “relevant scientific evidence is insufficient”, but, even recognizing a general level of uncertainty, the decisions and policies are considered as science-based normalization of risk, on the basis of the scientification of (GMOs) polity over the time. This means that, where there is this insufficiency of scientific evidences, the access to any form of participation to the dynamics of regulation of biotechnology becomes a scientific intervention and research, in order to bring and obtain the required “*additional information necessary for a more objective assessment of risk and review the [SPS] measure accordingly within a reasonable period of time*”.

This technoscientific asset and the establishment of a global governance of GMOs risk, looking at the WTO regulation in relation to the European development of this policy, is promoted as a sort of ‘universal’ trajectory on which different national and supranational political entities can create their own risk measures basing and according them on the standardization and “*risk assessment techniques developed by the relevant international organizations* (…) *with the objective of achieving consistency in the application of the concept of appropriate level of sanitary or phytosanitary protection against risks to human life or health, or to animal and plant life or health, each Member shall avoid arbitrary or unjustifiable distinctions in the levels it considers to be appropriate in different situations, if such distinctions result in discrimination or a disguised restriction on international trade*”.

Following this model, this means that for what concern biotech products, between the WTO and EU, with particular regard to the position of U.S. in the attempt of opening European trade boundaries to these goods, these kinds of global disputes challenge the constitutional scientific basis of EU, in the affirmation, by the WTO, of the illegitimate position of EU in its political opera of prevention and precautionary in respect to the importation of GM crops and food products.

Methods of research

In this work I used various typical methods of interpretation of social research, looking, especially from a methodological point of view, at the ST analyses, and in particular considering those instruments and qualitative methods based on approaches of integrated and multidisciplinary social investigation. The methods and instruments developed within the STS literature, although belonging in general to social sciences, using qualitative methods in 'distinctive' ways (Jasanoff 2008), stimulate sociological exploration in several directions, toward the epistemological, cognitive and material construction of different objects and fields of sociological analysis. In the light of the distinctive ways of using social sciences' instruments in STS, social research tools are adapted to the analysis of epistemological, heuristic and material reproduction of modern social orders – referring, in this study, to those methods and mechanisms presented through the summarisation of the of patters of co-production (Jasanoff 2004) in the GMOs case study.

Thus, the basic method of this work focuses on a qualitative analysis developed through a comparative study between two European countries. The comparative method of interpretation of social phenomena and processes is a widely affirmed approach of analysis within STS, in various works and among comparativist scholars (Jasanoff 2005; Parthasarathy 2005; Daemmrich 2004, Porter 1995; Wynne 1987). Moreover, in a broad spectrum of social sciences, many sociologists and political scientists have used this method for investigating different trajectories of public policy, constitutional developments, relations between scientific, economic, social and political sphere, in several countries, and in order to highlight the different chains of relationships constituting the biotechnology network in different contexts and national political cultures (Jasanoff 2005).

In this study, the exploration is founded on a binary comparison (Tarrow 1999) – between Italy and the UK – for differences, thus constructed mainly on the structural diversity between these two selected countries.

In this analysis, the category of nation state is extended by the notion of national political culture, as suggested by Jasanoff (2005), in order to consider national spaces as those structural contexts in which different epistemologies and national cultural agents contribute to the co-production of national political cultures. Expanding the concept of nation states, as basic unit of comparison, it is possible to identify the different variables that support the exploration of this research: firstly, I consider at the basis of this comparative work the two different positions of the central government of Italy and Britain in the GMOs policy. Thus, this comparison for differences is organized reconstructing the ways through which national governments have taken their decisions: starting the selection of the two national case studies on the question "yes or no to GMOs?"

The different position between the Italian and British government represents the main 'original' reason for which I chose these two European countries for this comparison. Through the observation of those processes and relationships that lead to these opposite national decisions, I intended to detect both the main differences and similarities between these two countries, trying to expand the spectrum of the notion of nation-states, focusing mostly on the singularities of national political cultures which are compared for their differences, but also for their common European basis of policy. In effect, comparative approaches and analyses within STS are generally aimed to highlight common aspects and singularities in the reproduction of the dominant national and international meanings, discourses, and material mechanisms relating to different epistemologies and representations of current democracies.

Therefore, in this binary comparison rather than considering as the unit of analysis the nation-state, as a given category, the attempt is to develop a more complex framework of exploration in which national states are considered involved and subjected at modification in the reproduction of the GMOs policy: as in imagined communities, the focus is on those dimensions of policies emerging through processes of technology and scientific regulation (Jasanoff 2005; Anderson 1983; Elam 1997). In these dynamics conflicts among different epistemologies and social commitments are

involved in the reproduction of national entities, representations and public meanings. In this sense, the idea of the nation state and national interest are, from this methodological perspective, interpreted as categories that need to be re-imagined in the light of the adaptation of authoritative structures in the modification of the relationships between citizens, science and national and international government and governance in current risk and knowledge democracies.

This methodological perspective leads to comparative research across multiple national contexts, and specifically in this binary comparison, the analysis is structured through two main phases-directions: *a)* the national case studies are constructed in order to explore the discourses and practices that constitute the main socio-technical imaginaries relating to biotechnology within the political boundaries of Italy and Britain; *b)* through these national entities the analysis is directed to those interpretations which can be more susceptible to generalizations and further comparison among national cultures, holding open a window on the European dimension of the GMOs regulation and policy.

With these attempts, I tried to focus on particular elements composing national and international biotechnology imaginaries, with particular regard to the Italian and British contexts, and considering particularly the formation of public normative concepts as: national need, necessity, emergency, risk, competitiveness, benefits, advancement, development. These elements are reproduced in order to extend the category of public interest or nation-state. Basically, this transnational comparison is based on the exploration of the ways through which it is possible to reproduce socially the current various models and ideals embedded in national policies and decisions relating to science and technology (Jasanoff 2006, Latour 1996, MacKenzie 1990; Winner 1986, Wynne 2011).

I considered the different forms of participation and public engagement in scientific governance of risk and emergency, and the reasons for which the emergence and development of some forms of

public policies of public engagement with science can be interpreted as a visible sign of the general crisis of legitimacy in which the biotechnology policy is developed.

In the light of these first methodological elements, in this comparative research I used several qualitative instruments that I adapted to the argumentations and ends of this study. Considering that, the guidelines that lead the interpretation of the comparative findings of this analysis are: *a)* all the material considered in this study has to be read in particular in the light of the last three decades of developments of biotechnology, and especially the last ten years, as that period in which the GMOs dispute becomes particularly salient in both countries selected for comparison (thus considering the relative delay of Italy respect the UK context in the development of this controversy);

b) for both the national contexts, I connected to the GMOs controversy a number of different but conjunct public issues and controversies. For example, in Italy, I reconstruct the relationships between politics and science referring particularly to the previous case relating to the Di Bella controversy[79]. Regarding the British case, several times I refer this analysis of the GMOs policy to the case of the BSE crisis, and also to other events of food and environmental crises[80].

Considering these guidelines, below I have summarized the main qualitative methods of analysis used in this comparison developing the GMOs case study in Italy and Britain.

Analysis of documents

In the light of the analytic goals of this study, I developed interpretive exploration of various official documents produced by the central and local governments of Italy and Britain, and several materials coming from technoscientific agencies, committees and from national scientific societies (like the Royal society in Britain, and the National Academy of Science, in Italy). I also considered different documents produced by EFSA and, generally, constituting the European legal system of

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the GMOs regulation. Thus I took into account documentations which are reproduced through both the official channels of public institutions and media. This kind of sources of research resulted to be necessary in order to reconstruct particularly the position, attitude and legal and official claims of national politicians and more in general of the various public authorities and stakeholders involved in biotechnology policy. Through these materials I tried to focus on the ways in which the GMOs issue has been contestualised in both countries and at the European level, and in particular, I analysed those documents in which public authorities have expressed their notion of 'necessity' and 'national need', 'progress', 'risk', 'innovation', 'profit', 'benefits', 'emergency'. In the reconstruction of these definitions, discourses and conceptualizations, I considered jointly official documents produced by national governments, scientific advisory authorities, NGOs, economic subjects as trade unions, privates companies, farmers unions, and all those stakeholders particularly involved in the GMOs national and supranational controversies[81].

Thus, the main documentary materials and resources used in this research are: texts of laws and international, European, national and local legal and juridical interventions and regulations; publications and communicative acts through which national governments' positions toward biotechnology are transmitted. Furthermore, I analysed different scientific reports and material which have been used in public consultation and public hearings relating to the different administrative level of the GMOs regulation. Governmental and technical committees' official documents, public declarations and claims of politicians, national scientific experts, members of NGOs, and also, all the set of bureaucrat and legal instruments which are used to compose the legal national and European background and network of the biotechnology policy and decision making. And, in order to highlight the emergency connotation of the GMOs risk policy, I take into account several government acts having force of law (legislative decrees)[82].

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This analysis on the documents is reproduced in the light of a reconstruction of the various contexts that, albeit partially, refers to a historical perspective. This means that the biotechnology debates are explored according to recent national and international history in which they have emerged, and considering GMOs controversy as a global dispute. From this perspective I considered specific characteristic, events and phases of development of the GMOs in Britain and Italy, cultural forces that have profoundly influenced the imagery on the basis of the specific relationships between scientific and political entities, which in this comparison represents one of the most evident elements of difference between these two countries. Consensus document for Italy; All the documents in Britain…

Interviews and participant observation

In order to reconstruct the GMOs dispute comparatively in Italy and Britain, I conduct research conjugating the analysis of official documents with a series of semi-structured interviews and informal colloquiums with a number of different selected witnesses who I identified, through the reproduction of the national GMOs networks, as particularly involved in the reproduction of the dominant meanings, imaginaries and events composing the national GMOs debate in each countries. Considering the relatively short time of development of the biotechnology innovation and GMOs controversy, it has been necessary to extend the analysis of the documents to the exploration of further original material collected through the frontal meeting with key social actors particularly relevant in the national processes of biotechnology policy and decision making in Italy and UK.

More precisely, I conducted more than 50 interviews, 30 for the Italian case and 25 for the UK, in which I interacted with several categories of GMOs stakeholders gathering information and material for interpretation: political representatives (politicians at national, regional, provincial and local level, as well as several mayors and councilors – these last only for the Italian case); representatives of national scientific community, members of various advice committees and particularly scientists which work in the field of biotechnology, life science and environmentalists. Concerning the

category of scientists, I identified as particularly relevant some actors who I interviewed because of their role within the two national governmental structure of policy and decision making and within the national public debate: among others, for the British case, I considered particularly important the interview with the biologist Lord Robert May, former president of the Royal Society 2000-2005, and chief scientific advisor of the British government, and Prime Minister Tony Blair, 1995-2000; and for Italy, the interview with Roberto De Fez, biotechnologist representative and responsible for the communication of the Italian scientific lobby supporting the GMOs campaign in Italy. Concerning the category of economic subject, I met national and regional representatives of farmer unions, farmers, producers and distributers within the Italian and British agro-industrial sector (in Italy, I interviewed representatives of Coldiretti, Confagricoltura, Coop, Futuragra and other national and local associations of farmers; In Britain I underline, in particular, the interview with Julian Little, Chair of the Agricultural Biotechnology Council, and promoter group of a balanced view on GM crops in the UK). Moreover, considering the wide and variegate composition of the GMOs network in both the national countries, I considered useful some meeting with members of NGOs, activists and representatives of environmental associations which have interacted with the different institutional and lay social actors composing the GMOs network.

It is also worth mentioning the fact that for the Italian case I identified as relevant the role of the Catholic church within the national GMOs debate and I used the material collected through the interview (and the documentations[83]) with a representative of the "*Accademia Vaticana delle Science*"[84].

These research activities were conducted on the basis of the typical structure and protocol of the semi-structured interview which I developed in the phase of field-research within both the European countries. The interviewees were identified mainly during the phase of the GMOs network reconstruction, through the textual analysis of media materials (principally on articles of national

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newspapers, as I summarised in the next subsection). Furthermore, the formulation of the list of people who I have contacted and interviewed partly is based using the technique of snowball[85]. In order to collect comparable data and materials, the script of the semi-structured interviews has been adapted to the two national contexts, and particularly to the situated events and historical elements which compose the GMOs controversy in these two European countries. In this sense, trying to have a common battery of questions both for the British and Italian case, I had to compose two different structures of interview where I tried to identified some common questions and issues and other specific and singular elements of investigation.

On the other hand, I developed a series of participant observations, both in Italy and Britain, in different social spheres of investigation: in Italy I participated (September 2010) at a regional and provincial hearing about the GMOs policy in the agricultural sector within the boundaries of a Italian Region and province, Friuli Venezia Giulia[86] and its autonomous province of Pordenone. Furthermore, in Italy I developed an ethnographic experience (Jasanoff 2005; Rabinow and Dan-Cohen, 2004; Marcus 1998; Latour, Cetina, 1998) in a scientific laboratory, following mainly the administrative and managerial work of a biotechnologist[87], director of a biotechnological center of research in Udine (Friuli Venezia Giulia, September 2010). In Britain, I participated in a meeting at the Royal Society (February 2011) where there were several subjects (social scientists, natural scientists, businessmen, members of NGOs) organized in order to discuss about the experiments of

[85] The snowball technique, in relation to the selection and sampling 'avalanche' of different subjects with which to conduct the interviews requires the necessary condition that, for this technique can be used and lead to the expected results, the members of the 'population' selected among the various fields, from the scientific to the political, to the economic, we know each other or which, however, are in a position to indicate other subjects or the population already indicated, or as orbiting attorono dynamics are investigated identified as actors responding to the characteristics that the investigation requires the intervistati. In thus, this technique allows, in addition to the preparation of individuals to contact for interviews, also a kind of testing and additional technical in the composition of networks of actors national compenti the dispute on GMOs in Italy and Great Britain. When, therefore, the first selected component names the first list of people to interview, after each individual who belongs to the initial sample are asked to indicate the name of other different members, connected to the network of relationships investigated. Those so identified with the exception of those that are already part of the original sample (stage zero) form the first stage. The latter are asked to report, in turn, the names of other people with whom they are related or who identify as salient in national debates on GMOs. The names thus obtained, except for those that already appear in the initial sample and in the first stage, forming the second stage. And so, following the same procedure at each stage, the sample is spread until it reaches the n-th stage, adding new individuals carrying the feature designed and linked to the previous one or more networks of relationships.

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public engagement with science in UK in the last decade: problems, improvements, reasons, rationalities and uses of these mechanisms, and level of democracy in public participation to scientific and particularly biotechnology policies. In all these experiences I had the possibility to reconstruct the network of biotechnology in both countries, at diverse levels, and the differences between Italy and Britain in this network-making; and to consider the ways of interaction between different political, economic, scientific and 'social' actors in these two European countries.

Further channels of data collection: media-analysis

In this research, an important source of data collection consists in the materials which I selected by the products of media, particularly by different articles of national newspapers. Thus, the analysis of relevant national discourses, themes, public imaginaries and judgments, is partly based on the main arguments which are reproduced through media, considering such source of data collection a common and important technique within STS (Neresini in Bucchi, Neresini, 2006).

In this regard, in this work I tried to operate an analysis of the media coverage about biotechnology and GMOs in agro-industrial sector, both in Italy and Britain. In order to develop this analysis and with the end to reconstruct the network of the biotechnology controversy in these two countries, I selected, collected and reviewed articles in which there were as main or secondary theme questions about biotechnology and specifically GMOs and agro-industry. In addition, I considered the analyses in literature about media coverage on the dispute of GM (Neresini 2006 in Bucchi, Neresini 2006) Specifically, I have taken into account more than 1500 newspaper articles, from several journals, but particularly from, for the Italian case, la Repubblica and il Corriere della Sera for about three years (2010-2013); and for the British case, I mainly considered The Guardian.

In the analysis of media products, through the principal channel of internet, I have to mention all the audio and video materials which I collected and considered in the presentation of the comparison and in the development of the two national cases. All these media products, articles, publications in scientific journals, video, interviews, broadcasts and televisions documentaries, in both countries,

are considered, in this study, as moments of crystallization of a series of social imaginaries and representations related to public issues, intercepting such situations and channels of powerful construction of national public opinion (Ezrahi 2004).

In synthesis, media analysis is a typical instrument of research in several social studies, particularly in STS, which object is on the reconstruction of political and public debates on issues related to risk and technoscience through media influence.

In this sense, public consensus-making has to be interpret as strictly connected to the dynamics of media reproduction of public opinion, through the mechanisms and logic of audience; this is because in the society of information public consensus around conflicting controversies in different national contexts is deeply influenced and performed through the role of media information's reproduction. At the same time, media analysis gives the possibility *a)* to compare between national contexts how much and how the case study is treated in articles and media expressions; and *b)* to consider the international dimension of diffusion of the GMOs controversy, for example in Europe, and to make a confrontation between the two national contexts and the EU level of regulation.

I collected several articles and above all I used some reconstruction of the biotechnology controversy based on media materials developed in STS and in those works that consider in detail both media cover on the GMOs issue in Italy and Europe (Neresini in Bucchi, Neresini, 2006), and, more generally, and the processes of public construction of social meanings about biotechnology through the role of media in turn in the reproduction of scientific knowledge (Durant et al., 1998; Gamson and Modigliani 1989; McComas and Shanahan 1999; Nisbet and Lewenstein 2002, Nisbet et al., 2003).

Phases of research

I developed this analysis mainly in two phases, during which I structured the two national case studies. During these over three years of research, I spent 16 months in the UK and I developed the

empirical analysis on the British case, I analysed the data collected in Italy, I revised the theoretical structure of the work, and I developed comparative analysis between the two national contexts.

In short, in a first phase, corresponding to the first 12 months of these over three years of research, I developed the framework of the project, choosing the approach, the case study and the two countries for the comparison. At this stage, I collected the first data and I drafted a list of the categories of subjects and actors involved in the debate, delineating the national networks and the general categories, institutions and authorities, at national and European level, that are involved in the juridical, political, economic and scientific regulation of biotechnology. In this phase, I have also reconstructed the international and European legal framework within which I have then displaced the study of national cases. In addition, in the final months of this first phase of work, I composed the list of contacts for the interviews for the Italian case. From September 2010 to January 2011 I developed research on field within the Italian national context, contacting and meeting several social actors, and conducting participant observation.

In the second phase of the work, I developed the Britain case study and comparative analysis between the two national contexts. This phase is divided into two key moments. A first visit for 10 months at Lancaster University, during which I studied and observed the political and cultural context within which the case of GM emerges in this country, also participating in a series of seminars and educational activities, which have widened insights, theoretical and research methods through meetings with various intellectuals, scholars and researchers, in particular, in the field of STS. Through this immersion in the British context, in order to identify and consider the various institutions and scientific research centers of this country, I constructed the network of this national case and I developed the fieldwork in this country. In fact, in the first ten months of study in the British case, I have developed the network of subjects and themes that make up the controversy over GMOs and biotechnology in Britain and delineate the list of contacts for interviews. Still in this first phase I developed almost all the interviews and participant observations.

During my second visit in UK, I reviewed all the material collected through these ten months, especially, from May 2012 to November 2012, and I produced both the last Italian version of this dissertation and this English summary.

Second Part

Outline of the two case studies: the biotech enterprise in Italy and Britain

Comparative analysis: the GMOs controversy in Italy and Great Britain

In this part I present the comparative analysis of the forms of the biotechnology regulation in Britain and Italy. In the following part I tried to reconstruct comparatively the processes of reproduction of the GMOs policy and public debates in these two European countries in the last three decades, taking into account as the common and wider normative, political and social framework the European knowledge society. In the following sections the dimensions of comparative analysis are developed through the methodological approach of binary comparison[88], in order to identify and interpret simultaneously differences and analogies which characterise the biotechnology policy and public discourses in these two diverse national political cultures.

On the one hand, in this comparison the common EU membership constitutes the structural element which connects the two national contexts each other, and it links, in this sense, the paths of development in the field of the biotechnology and GMOs policy in Italy and Britain, in the light of the common EU framework of GM products' normalisation. On the other hand, within this common European framework of regulation, this comparison on biotechnology policy and public debates about GMOs is structured through several differences in this field of regulation between Italy and

[88] As I have already underlined, from a methodological viewpoint, the analysis proposed in these pages is based on an approach of "binary comparison" (Gasparini, Strassoldo 1996; Trobia 2005), limited to two countries that I have chosen on the basis of the topic of this research. Thus, with regard to the field of the biotechnology policy, the selection of these two national contexts derives from the choice of the case study: Italy and Britain in their own national territory have reproduced two opposite GMOs policy trajectories. The Italian government has expressed a position of "zero tolerance" to GMOs, focusing particularly in the agro-industrial sector; by contrast the central British government has supported a policy in favor of the cultivation and commercialisation of biotechnological products, although considering the presence of only GM experimental fields in Britain and the absence of national GM cultivation for commercial end. Beyond the specific field of the GMOs regulation, Within the European framework, Britain and Italy can be considered as two very different political, juridical and cultural contexts for several structural elements. Taking into account one of the dimensions of comparison of this research, concerning the relationships between EU and European states, and considering the general different attitude of these two countries toward the processes of European integration, in the decades of development of the EU, as it is known, Britain has developed a position of Euroscepticism and autonomy compared to the constitutive role of Italy in these dynamics of the EU building and integration. In contrast to this general attitude of these two countries in Europe, in the GMOs regulation these different political lines are for several aspects reversed: generally, in the Italian regulation of biotechnology it is possible to speak about a conflicting relationship between the Italian government and the political and juridical direction expressed by the EU; while the path of biotechnological development taken by Britain can be considered closer to that produced at the Community level.

Britain. Particularly in the first phase of the definition and selection of the national contexts of comparison, the various structural differences between Britain and Italy and their opposite positions toward the development of the GMOs policy have guided this comparative analysis.

Thus, through this comparative study I tried to explore the situated and singular relational forms between science, politics and society in the biotechnology field of innovation in these two countries, and, at the same time, I aimed to identify a set of analogies and generalisations which can be observed from a crossed analysis of the GMOs regulation, and particularly if we consider the common supranational and European political and juridical framework where the GMOs policy has been characterised through the dominant definition of scientific risk issue and through the predominance of an approach of risk scientific assessment and management.

Taking into account the structural differences between Italy and Britain and their diverse constitutional form of state and government, the profound historical singularities and divergences in the constitutional relationships between politics, science and citizens, and also the discontinuities between the food culture in Italy and UK, I selected these two countries in order to develop this comparison on the basis of the different positions of the central governments in Italy and in Britain (particularly from 1990 to 2011) in the field of the GMOs policy, and specifically concerning the regulation of the production, cultivation and commercialisation of GM products. With a certain delay respect the developed of the GMOs debates in Europe and in Britain, in Italy since 2000 not only the GMOs cultivation and commercialisation are completely banned, but also the entire sector of biotechnological research, with the result that this field of scientific knowledge and innovation is almost completely blocked, in terms of public investments and governmental authorisations for practising this scientific activities on the field.

The strong opposition and reaction of the Italian governmental institutions – regional and at the state – to the possibility of the spread of GMOs into Italian environment can be read in the following collection of newspapers articles and documentary material of those years:

> In Piedmont are "discovered 381 acres of genetically modified corn. The governor Enzo Ghigo: *zero tolerance*" (*Corriere della Sera*, July 2004). The Turin procurator Raffaele Guariniello accuses the Italian Pioneer (the company that had sold the corn seeds) for fraud on the market. Thus, on 12 July 2004 forester guardians, city and financial polices come to deliver the denunciation (signed by the governor Ghigo) to farmers who had cultivated those GM maize "the one hundred and forty companies involved have had forty-eight hours to destroy the three hundred eighty hectares of corn" (1, 5% of Piedmont's production, with a total value of about three million in terms of farm). The urgency is justified by the need to "*avoid a catastrophe of biblical proportions. Pollen will fly in nearby fields and make them all gm*". That is what Legambiente affirms in a media comunication (Ansa). Indeed, the association "Greens and society" (Verdi e società) adds that it is necessary to act with emergency because "*pollen could fly over the Ticino Park and invade Lombardy* (...)" (Sala 2005: 68-69).

In Italy the GMOs policy has been dominated through this political and governmental attitude of *emergency*, *zero tolerance* to GMOs and high risk of even involuntary contamination from GM material. Through the emphasis on these terms, the Italian case can show how the application of the paradigm of the government of emergency, through – in this specific case – the rhetoric of scientific uncertainty[89], can justify 'urgent' actions of government, which are taken however, from the perspective of this comparative analysis, on the basis of a structure of decision making founded on a structural form of scientific domain and scientism that blocks a deeper public participation to the scientifised policies of risk and crisis of this phase of modernity.

In Britain the central government has expressed in the last decades a policy and a position in favour of biotechnological research and development and GM application in the agro-industrial sector. Even if in the 2004 the government of UK, after about two decades of scientific experiments developed in *Full Farm-Scale Trials* (FSTS)[90], approved and decided, through a so defined political

[89] (ANSA) - Rome, June 20 (2001) – "Environment Minister Alfonso Pecoraro Scanio has informed his colleague Paolo De Castro, Minister for Agriculture, with a note containing the negative opinion on the draft decree which identifies the protocols for the testing of the cultivation of transgenic plants - including cherry, strawberry, tomato, eggplant and olives - in the open field. Pecoraro Scanio, says a note from the ministry, "he Justified this decision on the basis of a scientific assessment of it technical Secretariat and an investigation that involved the competent departments of the Ministry of the Environment". In the note sent to the Minister De Castro, Pecoraro highlights as "despite the effort made by the technicians within the ministries Technical Coordination Committee for limit the risks, this represents the lack of evidence enough to avert the growing in open field transgenic plants can lead to contamination of traditional species. In Addition, it detects the absence of guarantees on law in relation to civil and criminal liability in houses of genetic pollution". "On the basis of these considerations - Pecoraro concludes its letter to De Castro - and in the absence of a framework of certainty and safeguards for the environment, consumers and the agricultural system, I express a negative opinion of the final adoption decree." (ANSA).

[90] This refers to the three types of GM crops, in England and Scotland, which obtained the authorisation by the UK Government, for experimental fields. Overall, nearly 300 tests were performed over a period of four years. Under the direct work of a commission nominated by the institutions of British government (primarily the Department for

compromise'[91], to authorise just one of the several GM products which were under experimentation, and considering, in any case, the fact that on Britain's territory there are not GM cultivation for commercial ends, in general it is possible to observe how the political position, in this country, expressed by the central government, is strongly in support and it appears fully committed[92] in the

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Environment, Food and Rural Affairs - DEFRA, and the Advisory Committee on Releases to the Environment - ACRE), scientists begun this phase experimentation, identifying 15 fields for the production of rapeseed, 16 GM corn fields, and 25 fields of sugar mixed with GM. All FSTS were monitored regularly to verify the results and any potential negative impacts on biodiversity (not only on plants, but also on the fauna of the countryside, animals, birds, insects, etc.., In and around the GM crops). Thus, considering also the wider European and international context, in Britain a first, provisional release of GMOs into the UK took place through the predisposition and formalisation of a series of experimental fields, defined as *Farm Scale Evaluations* (FSEs), in which GM products were tested into British ecosystem. This happened in the same period in which, considering the dispute on GMOs at the international level, the EU decided in order to unlock the de facto moratorium on the commercial distribution of GM products. *The Government's independent Scientific Steering Committee* approved the methodology and the statistical value of the data collected in those years of research and it has produced the following recommendations for each site which would have been planted from spring 2002: canola - up to 27 sites; forage corn - up to 35 sites; beet (sugar / fodder) - up to 25 sites. In addition, 18 farm-scale-sites of rapeseed were planted in the winter of 2002, for the collection in the summer of 2003. Each field has been planted with crops for half GM, and an equivalent non-GM crop in the other half. The fields have been selected to provide a representative sample for each crop, in terms of geographical spread and type of farm. The size of the field typically ranges between 2 and 10 hectares (Advisory Committee on Releases to the Environment, 2000, ACRE Annual Report n. 6, London: DEFRA; Agriculture and Environment Biotechnology Commission, 2001, "Crops on trial. London: Department of Trade and Industry", The Royal Society, 16 October, 2003).

[91] The decision of the British government, in April 2004, on the management of business licenses on GM crops in Britain, has been defined by several newspapers' articles of those years as a political compromise between the strong British public opposition to GMOs and the Britain's government economic and strategic interest with multinational of this sector and scientific subjects of the country. Making no reference to the report of the AEBC, which emerged in the public rejection of GM food, but accepting the proposal from the existing Bayer Crop Science Bt GM and the strict conditions laid down by scientific institutions of government (especially in the ACRE), the British decision is expressed as favorable to the introduction of GM products, on which have developed national experimentations in previous years, because scientific evidence demonstrated the non-harmfulness and a tolerable level of risk associated with these products . However, this decision desponded the Bayer cultivation, on British territory, for commercial purposes, for the high cost and complex procedures under which to obtain the national authorisation. In this sense, since 2004 the GM crops remain implanted because it is extremely costly in terms of procedures, time and documentation to be produced, although officially accepted by the British government.

[92] Differently than in Italy, where the biotechnology debate has been particularly focused on the conflicts between science and politics, In Britain the GMOs controversy has been particularly developed through the social frictions produced by the divergent position between the British governmental strong interest and commitment in supporting the GMOs policy and the diffusion of these markets and products, and the general public environment of crisis, mistrust, social skepticism and concern about political, scientific, economic and juridical management of the GMOs policy. The governmental positive position of Britain toward the GMOs spread is retraceable since the eighties of the last century, and stronger in the last two decades: "The concerns of European consumers about the potential health and environmental threats of GM crops have resulted in an unprecedented effort to investigate those anxieties and communicate with the wider public, particularly in the UK, where the use of public consultation has been extensively developed. The first of these initiatives was the extensive Farm Scale Evaluations of three GM crops (herbicide-resistant beet, oil seed rape and maize), whose results were published last year (Firbank, 2003 and articles cited within; Turner, 2004), followed by the Advisory Committee on Releases to the Environment's report to the UK government (ACRE, 2004). There has also been a major review of the science relevant to GM crops and food, chaired by the Chief Scientific Advisor to the UK Government (GM Science Review, 2004). In addition, the UK Agricultural, Environmental and Biotechnology Commission has produced a series of reports on the scientific, social and ethical implications of sowing GM crops (http://www.aebc.gov.uk). The Nuffield Council on Bioethics' paper on 'The use of genetically modified crops in developing countries' (2004) reaffirmed its earlier conclusion that "there is an ethical obligation to explore these potential benefits responsibly, in order to contribute to the reduction of poverty and to improve food security and profitable agriculture in developing countries" (Nuffield Council on Bioethics, 1999). Finally, the British Medical Association recently stated in its report 'Genetically modified foods and health' (BMA, 2004) that "The BMA shares the view that there is no robust evidence to prove that GM foods are unsafe" and that

developing of the GMOs and biotechnology enterprise in the national economy and in the European market.

> The British government has now made a decision on the basis of this mass of evidence. On March 9 this year, Margaret Beckett MP, UK Secretary of State for Environment, Food and Rural Affairs, made a statement in the House of Commons saying *inter alia* that "There was no scientific case for ruling out all GM crops or products" (Beckett, 2004) and announced agreement in principle to the commercial cultivation of GM herbicide-tolerant maize, subject to some conditions. Beckett further said that "There is no scientific case for a blanket approval of all uses of GM, and equally there is no scientific case for a blanket ban on the use of GM," although she took into account public concerns. "Most people believe that the use of genetic modification should be approached with caution. They want strong regulation and monitoring and in addition, some want a framework of rules for coexistence of GM and non-GM crops, and customers want a clear regime for traceability and labelling so that they can make their own choices." (Burke 2004:432-36)

These divergent starting positions of Italy and Britain have constituted the principal reason for which I selected these two countries for this comparison, and I focused the attention on the singular politico-cultural relationships and forms of interactions between national authorities-structures and (political, economic, scientific) social agents which compose the biotechnology network, characterising and differentiating the GMOs controversy through this opposite political result.

Furthermore, the Italian and British contexts result to diverge each other on the basis of a set of structural elements which are considered in this research as factors always and all together integrated in the development of the GMOs policy and public debates: first of all, the different forms of state and government are considered in these pages as an interpretative element of the long term processes of state and nation building particularly in relation to the conjunct dynamics of institutionalisation of science in each national culture and their influence in the formation and maintenance of western modern democracies. Thus, taking into account these historical and cultural processes, I introduce this analysis considering the development of these two different trajectories of biotechnological policy within the constitutional structure of power characterised by the Italian parliamentary republic, and the British constitutional monarchy based on a parliamentary system.

"genetically modified food has enormous potential to benefit both the developed and developing world in the long term.""(Burke 2004:432-436)

From a structural viewpoint, the United Kingdom of Great Britain and Northern Ireland, commonly known as the United Kingdom (UK) or Britain, represents the sovereign state, located off the north-western coast of continental Europe, which I considered in comparison with Italy. The UK[93] is taken into account as a unitary state governed under a constitutional monarchy consisting of four constituent countries: England, Northern Ireland, Scotland and Wales. The latter three of these are developed through a strong relationship of independency with the central state's administration, but at the same in a deep exigency of unitary especially in those fields of domestic and foreign policies in which are involved matters of national security, research and development, innovation, international commercial and diplomatic relationships.

Considering this constitutional structure of the Britain state, in the GMOs controversy, questions of national (food and environment) security, policies of research and development and trajectories of technological innovation are involved and, with particular regard to the agro-industrial sector, the GMOs dispute challenges the unitary organisation of the British agricultural system of production and food commercialisation, opening and/or reinforcing conflicts of attribution and competence between the central state and the different position of the British countries. In comparison with the division in autonomous regions of the Italian territory, through the GMOs controversy is possible to observe the several conflicts and problematic questions of power and competences attribution between the different levels of the GMOs regulation, from the supranational and central state to the local entities, making visible the dimension of situatedness of the intricate relationships between the processes of reproduction of the social and knowledge orders.

As I shall take into account in this comparative analysis, In Britain the positive and promotional position of the central government toward GMOs, particularly in agro-industrial sector, and the ways in which the national GMOs debate and policy have been developed so far, results to be in

[93] As I have implicitly done so far, in this research I referred to the entire territory of the UK and considering mainly the central government of Britain relating to the GMOs policy regulation.

conflict with the political direction of the different countries, especially with that of Wales[94] and Scotland which have expressed their opposition to the development of the UK as a GM nation.

Thus, concerning the British constitutional and territorial structure, it is possible to note a dimension of conflict between the central regulation and position toward GMOs and the political and economic direction of these countries.

By contrast, in Italy the opposition of the central government to the GMOs research, production, cultivation and commercialisation, and the decision of "zero tolerance" to GM products result to converge with the GMOs policy of all the Italian regions[95], which have expressed so far, in the lasts State-Region Permanent Conferences (2011), their rejection of biotech cultivation.

Considering this conflicting situation in Britain, and comparing it with the general agreement between Italian regions and the central state in their opposition to GM products, in the case of the biotechnology regulation, in Italy and Britain we can consider two different tendencies. In Italy, particularly since 2004[96], the central government, in line with the Constitutional modifications in

[94] As I tried to develop in the reconstruction of the British national case study, in 1998 in Wales a national experimental field of corn and rapeseed gm were affected by the action of protest group of activists and demonstrators, especially from Greenpeace and Friends of the Earth. In this case, considering the opposition of the Welsh local government to the spread of GMOs, considering the situated and specific local resistance of the population of this country against GMOs, the Welsh Court of Justice has considered innocent the activists which destroyed GM field, and rather as a disobediend of the local normative the farmer which accepted to cultivate that GM experimental field organised by the central UK government. Thus, as in Scotland, in Wales the local government has expressed a position in contrast to the UK central government: this dimension of analysis permits to explore the action of different dislocated groups of associations, social forces and green NGOs that, together with the resistance of the local population, in the GMOs controversy, are creating from the bottom particular form of opposition to the tendency of centralisation and scientification of some controversial political issues represented as highly scientific and technological. In this dimension of comparative analysis, it is possible to highlight the development of global and local network of resistance, this is also because in most of the countries, currently, such groups have their own more or less institutionalised network and contact group. These groups, jointly or independently, follow their campaigns and very often canalise and meet local popular forces of resistance in controversial and global challenges of social changes, as in the GMOs issue. Generally, the opposition to the spread of GMOs is one of the campaigns promoted by these organizations around the world.

[95] Particularly in the last years, and specifically in one of the last annual State-Region Permanent Conferences (September 2011) – the organisms which coordinate the governmental, structural and political work of Italian regions with the central Italian state –, all the Italian regions have voted in favour of a GM-free policy on their territories. All the regions, together and against GMOs, except Lombardy, which decided for the abstention from the vote.

[96] In these years, within the Italian context it is possible to observe also a more general shift, from the 1990-2001; 2002 reforms of regional autonomy, Title V of Constitutions, particularly in matter of competence between regions, provinces, and state. Thus, concerning GMOs regulation in line with this general tendency in Italy, since the 2004 the legislation about the coexistence is a competence of the Italian regions: "the Presidents of the regions have embraced the position of agriculture councilors opposed to GM crops. This was announced by the agriculture commissioner (Puglia), Dario Stefano, who as coordinator of the Committee on Agriculture gave a report to the Conference of Presidents unanimously approved the agenda on the 30th September (2011). Agenda that delivery to the government a

terms of autonomies of Italian local entities, has delegated to the regions the competence about the decisions, organization and implementation of the coexistence guidelines on the Italian territory. This means that, as the central government is against the development of biotech agriculture, and also considering the opposition and the claim of *GM free* of the Italian regions, in this delegation and decentralization of the central state to the several regions there is an *implicit* attempt to avoid to commit the central state level in the development of a coexistence normative about biotech cultivation; and an *explicit* tendency of dislocate the definition of the plans of coexistence to regional-local entities, thus as close as possible to citizens, following the European principle of vertical and horizontal subsidiary. In fact, this Italian tendency is in contrast both with the British context and within the European framework, mainly because in Britain as well as in Europe the general politico-juridical tendency of national authorities in the biotechnology field is expressed through a stronger concentration of the GMOs assessment and management at the centre of the State, in UK, and at the European level for the EU.

Particularly concerning the development and implementation of the environmental protection, food and health security, these are matters that currently in Italy as well as in Britain result to be in a 'competitive' relationship between the central state and local entities. In Italy, considering the conflicts about that with the EU, the national management of the GMOs controversy results to be in line with the general Italian current constitutional reforming tendency which is operating on the constitutional powers and competences between the central state and the local entities (Regions, Provinces, towns), and which has been formalised since 2001-2002 with the reform of the V Title of

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strong position of the regions in the GMOs issues. The current position of the regions, said Stefano, to which the Constitution recognizes the absolute competence on this issue, is of firm opposition to the authorizations for the cultivation of GMOs in the country. This is a shared position by the central government that commits the Minister Galan to represent this opposition also at meetings of the European community." (http://www.dailymotion.com/video/xh2urb_ogm-stefano-no-delle-regioni_news#.UWU-bzfD7Y0) From a juridical and legal viewpoint, in the agreement between Italian regions and state, the Italian constitutional tendency to the decentralization of competence in this specific matter results in conflict both with the European tendency to centralize the system of organization of the GM policy in agriculture, and with the British exigency to promote and achieve a unitary policy of development in biotechnology sector.

the Italian Constitution[97]. In the spirit of the European principle of horizontal and vertical subsidiary, in the Italian GMOs case study, this tendency of decentralization is confirmed and it seems nevertheless to create some problems with the system of regulation of GMOs in Europe, where, rather, it is possible to observe, in the decades of European integration, a trend of centralization of the assessment and management of (economic, politic, scientific) risks, generally through the reproduction of technical organizations, commissions and authorities which base their power on the neutrality and scientific rationality through which political decisions are taken and citizens' lives are ordered: the role of EFSA is crucial in this discourse.

The reproduction of the GMOs regulation appears, in this sense, as a dynamics of co-production of that form of normative knowledge which is able to normalize the risk issues in those situations which social and public resistances, conflicts and mistrust are involved. In the GMOs controversy in the European, British and in Italian context, but within different structure-agents relationships, it is as if economic, political, public interests and concerns are neutralized through the formation of a set of technoscientific structures and institutions that, in scientifised arenas of policy, are places as arbiter of the different meanings, judgments and visions of human development and progress. This occurs through the formation of states of emergency and necessity in both countries, although we have different political results and kinds of structure-agent relationships.

In this comparison, through the idea of scientification of policy and politics, the GMOs case permits to explore some differences and analogies between Italy and Britain, particularly concerning the agro-industrial sector, observing the continuity and discontinuity between diverse fields of scientific policies and several crucial scopes of technoscientific innovation and trajectories of economic development. For example, it would be stimulating to observe particular differences and singularities through a combined focus on the nuclear policy and the GMOs controversy, in Italy and Britain, thus considering several areas of 'scientific' policies and those political decisions in

[97] Titolo V Cost. It. "Le Regioni, le province i Comuni"; artt. 114-133; "Norme relative ai governi locali" (V Title Cost. It. "Regions, Provinces, and Municipalities"; artt. 114-133; "Rules relating Local governments").

which are involved controversial relationships between citizens, politics, science, economic and juridical systems.

In this sense, I argue that it is possible to make some generalization on the general tendencies through which in these two countries the scientific policies are treated and faced by scientific and governmental institutions in their relationships with citizens. Taking into account the nuclear field of 'scientific' policy, the general disposition of power and some of the relational forms between science, politics and citizens which emerge in the debate on nuclear power are reproduced in the biotechnology policy. For example, Italy has the world's ninth-largest defence budget, and shares NATO's nuclear weapons, but it cannot be considered a 'nuclear state' and unequivocally the Italian population has voted twice (abrogative referendums 1987; 2011) against the development of nuclear power on Italian territory.

Connecting the GMOs controversy to the development of nuclear national debates and policy in these two countries, the structural divergences between Italy and the UK and the different positions about risk issues and technoscientific and innovation policies can be observed in both these fields of "technoscientific" public controversy, with some specific considerations: Italian governments, differently than in the GMOs policy, where the governmental opposition to these products is more defined and constant, have oscillated in recent decades, after the first referendum on nuclear power in Italy, between position in favor of the resumption of nuclear energy, and nuclear policy decisions and trajectory opposed to the development of this field of technoscientific innovation in Italy. At the same time, public opposition to the implementation of nuclear station on Italian territories can be considered well tested in the two referendums which have expressed the strong resistance of Italian population to the nuclear power within Italian boundaries. Confronting the diffused debate and controversy on the nuclear with the GMOs policy, it is retraceable a sometimes softer and sometimes stronger position of Italian government of persuasion of public opinion to the nuclear network and enterprise. By contrast, considering the divergent political results and decisions

between Italy and Britain, as for GMOs policy, in the UK the nuclear enterprise has been developed, among public controversial debates and social conflicts, since the end of the Second World War, through a policy of expansion of nuclear power and its applications on the British territory.

Thus, situating this combined perspective on the (biotechnology and nuclear) scientific policies in Italy and in Britain, there are several structural elements of difference which can be considered. In the international geopolitics, the UK is considered a developed country and has the world's seventh-largest economy by nominal GDP and eighth-largest economy by purchasing power parity[98]. Historically, it was the world's first industrialised country and the world's foremost power during the 19th and early 20th centuries[99]; and the UK is still referred to a great power[100] and retains considerable economic, cultural, military, scientific and political influence on the international level[101]. It is a recognised nuclear weapons state, not without social and political conflicts about this public issue, and its military expenditure ranks fourth in the world[102]. Considering the international arenas[103], the UK has had a constitutive role in several processes of international organizations' constitution and in the establishment of global agenda and governance in different strategic fields of public policies and it has a very deep and constitutive historical relationship with the USA.

On the Mediterranean side, the Italian Republic is represented within the international political panorama as a unitary parliamentary republic of Southern Europe[104]. It has been ranked as the

[98] Mathias, P. (2001). *The First Industrial Nation: the Economic History of Britain, 1700–1914*. London: Routledge.
[99] Ferguson, Niall (2004). *Empire: The rise and demise of the British world order and the lessons for global power*. New York: Basic Books.
[100] Sheridan, Greg (15 May 2010), "*Cameron has chance to make UK great again*". *The Australian* (Sydney).
[101] Dugan, Emily (18 November 2012). "*Britain is now most powerful nation on earth*". *The Independent* (London).
[102] "The 15 Major Spender Countries in 2011", *Military Expenditures*. Stockholm International Peace Research Institute.
[103] UK has been a permanent member of the United Nations Security Council since its first session in 1946; and it has been also a member of the European Union and its predecessor the European Economic Community since 1973, but taking a very independent position respect the different processes of European integration, particularly considering its refuse to enter in the Eurozone and, more in general, its Eurosceptic behavior and attitude in Europe. It is also a member of the Commonwealth of Nations, the Council of Europe, the G7, the G8, the G20, NATO, the Organisation for Economic Co-operation and Development (OECD) and the WTO.
[104] To the north, it borders France, Switzerland, Austria, and Slovenia along the Alps. To the south, it consists of the entirety of the Italian Peninsula, Sicily, Sardinia – the two largest islands in the Mediterranean Sea – and many other smaller islands. The independent states of San Marino and the Vatican City are enclaves within Italy, while *Campione*

world's 24th most-developed country[105], and it has been indicated in the world's top ten in 2005 for its Quality-of-life Index[106]. This data results to be connected with the high quality imaginary of the Italian products and foods which production is mostly developed in small industries, and very often conducted by a family business: it is a model of agro-industrial production which reproduces the imaginary of the controlled origin of the products and monitored throughout the entire chain of production. Within this structure, the risk of contamination – from GM seeds and products – is sensibly recognized from the Italian agro-industrial trade unions and in the politico-economic rhetoric of Italian government. In this respect, it is possible to say that the peculiar Italian food culture is one of the elements for which in the international imaginaries Italy is identified for its high standard of living (apart for its high GDP per capita[107]). In this sense, particularly concerning the development of the public policy and debates on biotechnology and GM products, the singular food Italian culture – its variegate regional traditions of typical foods and dishes, and the 'symbolic' dimension, in recent decades, of the 'style' of production and consumption, particularly in the agricultural sector, represented by the label *slow food* – is one of the most specific elements which characterises Italian national culture in general, in the European and international panorama, and which has a very often explicit and deep influence in the reproduction of socio-biotechnological imaginaries and in the dynamics of regulation of GMOs on this national territory, particularly in the GM food and crops debates.

Concerning the relationships between these two national contexts and the European level of regulation, structurally, as I mentioned before, differently than Britain, Italy is a founding member of the EU and it is part of the Eurozone, and it has had a crucial role in the processes of European integration, in its different phases, as founder state, with a general political behavior and an attitude

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d'Italia is an Italian exclave in Switzerland. The territory of Italy covers some 301,338 km (116,347 sq mi) and is influenced by a temperate seasonal climate. With 60.8 million inhabitants, it is the fifth most populous country in Europe, and the 23rd most populous in the world. "Monthly demographic balance: January 2011", Istat, 10 September 2011; "Census 2011 - Preliminary Results Update", Istituto Nazionale di Statistica.

[105] "*Human Development Report*" 2011 United Nations. 2011.

[106] The Economist Intelligence Unit's quality-of-life index, Economist, 2005.

[107] "Report for Selected Countries and Subjects" Imf.org. 14 September 2006; "DDP Quick Query" Ddp-ext.worldbank.org. 20 July 2004.

of promotion and euro-optimism, and very often enthusiasm for the development of European political and economic integration. These two general positions and attitude of Italy and Britain in Europe and toward the EU integration are for several aspects inverted in the case study of the GMOs policy: the Italian government decision in this field of scientific regulation results deeply in conflict with the European promotion of GMOs; rather, the European approach, and particularly the perspective and the attitude of the European Commission to biotechnology and GM products, especially after the 2004, can be considered in line with the development of this policy in Britain. This is not only for the common policy of support to biotech enterprise, but also for the development of a serious of political practices and sub-area of policies through which the aim of both the European and Britain authorities has been to regain pubic legitimation, trust and consensus concerning the scientific governance and the governance of science. Considering also the juridical conflicts between Italian and European regulation of GMOs, in Italy these forms of policy of public understanding of science and public engagement with science do not have the same centrality, development and *raison d'être* which they found in the British public context and in the rhetoric and in the documents and legislation of the EU, centralized, in the GMOs case study, on an approach of scientific domain in public decision and, at the same time, public trust construction through the creation of a set of fields of sub-policies of institutionalized experiments of public engagement with scientific institutions, subjects, objects which act as political agents and as actants in the reproduction of the biotechnological network.

From this comparison it seems that these institutional (scientific-politics) forms and attempts of regaining public trust, credibility and consensus are connected to the different attitudes of the European governments toward, in this case, GMOs: in the Italian GMOs controversy the relationships between the position of public opinion and the governmental decision is consensual; rather, in Britain the contraposition between public opinion and central government, and the fact that British public is expressing in the years its skepticism in the commercialization and production

of the GM products is producing the exigency of implementing policies in order to achieve a higher level of public trust in the GM enterprise.

This divergent position between the Italian and British contexts is reproduced within peculiar and specific relationships between political and scientific institutions/subjects and citizens, influencing the dynamics of public participation and the formation of those particular forms of policies of engagement with science, specifically peculiar to the UK system. From this comparison between Italy and Britain, these experiments of public engagement in 'scientific' decisions seem to be: *a*) functional and particularly used when there is a situation of public opposition, resistance and contradiction to specific governmental decisions and policies; and *b*) they represent a common instrument of construction of public consensus around GMOs through practices of institutional engagement of citizens particularly of those (political, scientific, economic) stakeholders which are aimed to develop the GMOs network and that are in favor of GMOs. In fact, in Italy this emergency of public (and politics) engagement with science is mainly expressed by the Italian scientific subjects who are involved in the campaign in favour of GMOs and against the governmental Italian position and decision.

These divergences and different developments and also those points of conjunction between Italy and Britain are the result of situated processes of co-production of forms of normative knowledge through which, both in the case of conflicts between scientific and political subjects, as in Italy, and in the circumstances of general consensus and agreement between scientific and governmental authorities, I see the affirmation of the state of emergency as the paradigm of government of the GMOs policy that is justified in both countries through the scientific disposition of public debate and regulation of GMOs risk assessment and management. As I described in the theoretical part, this is partly attributable to the wider and ambivalent European regime of emergency displayed through the precautionary approach applied in the GMOs controversy. Both the Italian and Britain

governmental decisions are claimed to be based on the precautionary principle, although they bring to two different political results and the policy is developed and structured in very different way.

On the 9th March 2004, formalising and making public the governmental decision, the environment secretary Margaret Beckett, in her GM speech to the House of Commons, concerning particularly the commercial planting of genetically modified crops, underlined how the governmental decision has been developed on the basis of science and of the precautionary principle[108], which confers legal form to the emergency normative regime founded on the centrality of scientific assessment and management.

> In the UK only a handful of foods have been approved for use – GM soya and tomato puree and some forms of maize – the first two approved under the previous administration and the maize in 1997 and 1998. At present NO GM crop has all the approvals needed for commercial cultivation in the UK. Decisions as to what can be consumed or grown in the EU as a whole have been taken throughout by member states collectively under a regime of safety testing, monitoring and control which itself dates back ten years. This legal framework has recently been substantially strengthened, and that much strengthened regulatory regime came into effect in the UK last year. It is firmly based on the precautionary principle as applied on a strictly case-by-case basis. Every GMO for which authorisation is sought must receive a comprehensive prior assessment of any potential risk to human health or the environment. In 1998 this government decided to go further. We were advised by English Nature of their concern about the effect of current GM herbicide-resistant crops on biodiversity. It was agreed that farm-scale trials would be conducted to assess these risks. Those trials were largely completed and reported by the end of last year, and their results referred to our independent advisory committee for their assessment. ("Margaret Beckett's GM speech", The Guardian, 9 April 2004)

Thus, as I analysed through the development of the two national cases study, even though producing two different paths of policy and through divergent science-politics-citizens relationships, the emphasis on the dimension of scientific risk assessment and management in biotechnology debates, and the idea of profound social resistance translated in a problem of public 'ignorance' of 'lay' citizens, in highly 'scientific' matter, are elements which connect the Italian and British contexts with the European framework of regulation and with the general approach in

[108] "I believe the approach I have outlined today is the right one. It is precautionary. It is evidence-based. In practice it means licensing one application, which runs till October 2006, and is subject to two further conditions. Apart from the scientific decisions which flow from the trials there is the related issue of GM and non-GM crops being grown in the same area - so-called coexistence. And the AEBC has recently produced advice on this issue" (The Guardian, 09 April 2004).

Europe through which the GMOs enterprise has been developed so far ambivalently as a necessity and an emergency. This rhetoric and the dominant linear model of science in politics and particularly in risk policy represent a common element in all these contexts, although they produce different political results, and they are expressed through the actions and discourses of different networks of alliances (and conflicts) among the social actors particularly involved in the GMOs controversy. For example, the emphasis on the ignorance and the risk of social resistance to the development of GM products and biotechnology is transversally a concern of most of the scientific Italian community, the British scientific societies and political governmental authorities, and of the European institutions.

The common interpretative scheme of public/political concern about GMOs is developed translating public/political reasons/concerns in irrational and anxious reaction produced by a not fully acknowledgment of the matter under regulation. And this is extendable in general to the European context, and it is a position/vision which belong to different (political[109], scientific, economic) stakeholders in the GMOs controversy which leads, in different contexts, to identify as solution for these conflicts of public meanings an even stronger injection of science in political processes and decision-making.

[109] In Margaret Beckett speech about GMOs, she analyses the situation of public concern about the biotechnology policy and the reaction/consideration of public institution about this conflicting and controversial situation of public mistrust, as it is possible to read in the following words, public concern is generally translated into a public state of anxiety which justifies the paradigm of emergency of the scientific assessment and management of this field policy: "In the meantime another advisory committee had advised the government to fund an independently-run public debate or dialogue on GM issues. I accepted that advice and in May 2002 announced that the government and the devolved administrations would sponsor such a dialogue with three strands - the debate itself, a thorough review of the science, and an economic cost and benefit study by the Prime Minister's Strategy Unit. The public dialogue reported general unease about GM crops and food and little support for early commercialisation of GM crops. *People already engaged with the issues were generally much more hostile. Those not so engaged were more open-minded, anxious to know more*, but still very cautious and it was suggested that as they learned more their hostility deepened. The costs and benefits study concluded that the GM crops currently available offer only some small and limited benefits to UK farmers, but that future developments in GM crops could potentially offer benefits of greater value and significance even in the United Kingdom. The Science Review concluded that GM is not a single homogeneous technology and that applications should continue to be assessed on a case-by-case basis. It reaffirmed that there are some gaps in scientific knowledge and in particular that it is important that the regulatory system is kept under review so that it keeps pace with any new developments. But it concluded that there was no scientific case for ruling out all GM crops or products. It examined all the concerns generally raised. In particular it reported no verifiable ill-effects from extensive human and animal consumption of products from GM crops over 7 years, and it concluded too that current GM crops were very unlikely either to invade the countryside or to be toxic to wildlife. The most important environmental issue identified was indeed the effect on farmland wildlife which was the subject of our extensive trials - the largest carried out in the world". (Margaret Beckett, The Guardian, 09 April 2004)

> European consumers' continuous and ardent opposition to GM crops and foods has had serious repercussions for plant research, for the commercial development of new crops and, most importantly, for developing countries that could benefit most from GM crops. Several countries in Africa and elsewhere have resisted growing such crops, mainly for fear of being unable to export them to the European market (*The Economist*, 2002). It is therefore worthwhile to investigate what actually went wrong in the debate about GM food and crops in Europe and how these foods have earned such a bad name. Such an analysis could not only help to overcome public fears of this technology, but also help scientists and policy makers to address similar concerns in the future, such as the growing debate over nanotechnology. The concerns of European consumers about the potential health and environmental threats of GM crops have resulted in an unprecedented effort to investigate those anxieties and communicate with the wider public, particularly in the UK, where the use of public consultation has been extensively developed. (…) The British government has now made a decision on the basis of this mass of evidence. On March 9 this year, Margaret Beckett MP, UK Secretary of State for Environment, Food and Rural Affairs, made a statement in the House of Commons saying *inter alia* that "There was no scientific case for ruling out all GM crops or products" (Beckett, 2004) and announced agreement in principle to the commercial cultivation of GM herbicide-tolerant maize, subject to some conditions. Beckett further said that "There is no scientific case for a blanket approval of all uses of GM, and equally there is no scientific case for a blanket ban on the use of GM," although she took into account public concerns. "Most people believe that the use of genetic modification should be approached with caution. They want strong regulation and monitoring and in addition, some want a framework of rules for coexistence of GM and non-GM crops, and customers want a clear regime for traceability and labelling so that they can make their own choices." (Burke 2004:432-436; Burke, interview, March 2011)

Similarly in Italy, particularly the broad group of Italian scientists which has developed the campaign in favour of GMOs on Italian territory has used the same interpretative scheme about 'political' and 'lay' citizens' concern, proposing a stronger injection of science in the Italian GMOs debates and decisions mostly in order to develop a policy more strongly based on science, because, in Italy, from the perspective of these scientific subjects, this field of decision making has, rather, been constituted on the basis of the obscurantist anti-scientific and irrational position of the Italian government.

> The voice of science is certainly more reliable humanly – as well as intellectually – more aware than those not controlled and dogmatic, which out from every scientific relevance, pretend to say "truth" based on irrational emotion typical of obscurantist cultures. From this regressive culture arise, for example: the almost exclusively attribution to human activities of the effects, while worrying given the stakes, such as climate change that for millions of years are characteristic of the planet Earth, while the problem of their origin is still open; restrictions on biotechnology research that prevent our researchers to cooperate and achieve scientific breakthroughs that could, among other things, fight serious diseases and help to alleviate the problems of feeding humanity; Research and uncritical exaltation of miraculous of medical practices that are deemed reliable just because "alternative" to scientific medicine; terrorism on the health risks of electromagnetic fields,

which wants to impose precautionary limits unjustified, more dramatically lower than those accredited by the international scientific community and adopted in all industrial countries; and the persistence of a state of emergency in the treatment and disposal of all kinds of waste: a condition provided through the prejudiced rejection of technological solutions used for decades in all advanced industrial countries; the systematic opposition to any attempt to provide the country with infrastructure vital to the continued development and improvement of the quality of life of population; foreclosure dogmatic nuclear energy, which penalizes the country not only in economic development, but also in achieving the objectives of rationalization and environmental compatibility in the energy system. The climate of obscurantism in place is likely to contribute to the discouraging of young people from scientific courses of study, currently characterised through an anti-humanitarian and anti-environmentalist spirit and connotation, encouraging a process that is likely to foreshadow a future of cultural dependence as well as economic of the country. Science does not produce miracles, and is not, in itself, a harbinger of disasters. Always it is an integral and driving force of the evolution of human society, the prime mover of social progress, economic, health and environmental. Based on this knowledge, scientists, researchers, technicians of all cultural backgrounds and of all creeds, unrelated to any industrial interest and aware of the fact that the scientific effort and commitment should not be confused with the however legitimate ideological, political and religious beliefs, arise to contrast this opera of misinformation and cultural retreat, claiming the value of science as a primary source of knowledge designed to the civil development and progress, without distortion and unacceptable filters. We are constituted in the movement "Galileo 2001" for the freedom and dignity of Science, open to those accessions most qualified, sincere and disinterested. We call upon the scientific and cultural associations to engage selflessly, together with the institutions, in a battle for a form of information competent and ethically correct. We turn to the civil society, media operators and to those more attentive political representatives hoping that they know how collect this message and help us to overcome the barriers of fundamentalism and misinformation. We want the new century is also for our country –that gave birth to Galileo, Volta, Marconi and Fermi – that (century) of scientific truth and reason, much more aware of how much more knowledge-based. They probably will not be enough, but they are certainly necessary. ("Associazione Galileo 2001" 2004:8-9)[110]

[110] The translation of this document is mine, as most of the Italian documentations and statements reported in this dissertation. I report the Italian text of this crucial Italian scientific position: "La voce della scienza è certamente più affidabile e anche umanamente – oltre che intellettualmente – più consapevole delle voci incontrollate e dogmatiche che, fuori di ogni rilevanza scientifica, pretendono di affermare "verità" basate sull'emotività irrazionale tipica delle culture oscurantiste. Da questa cultura regressiva nascono, ad esempio: l'attribuzione quasi esclusivamente alle attività antropiche di effetti, pur preoccupanti data la posta in gioco, quali i cambiamenti climatici che da milioni di anni sono caratteristici del pianeta Terra, mentre il problema della loro origine è tuttora aperto; le limitazioni alla ricerca biotecnologica che impediscono ai nostri ricercatori di cooperare al raggiungimento di conquiste scientifiche che potrebbero, tra l'altro, combattere gravi patologie e contribuire ad alleviare i problemi di alimentazione dell'umanità; la ricerca e l'esaltazione acritica di pratiche mediche miracolistiche che sono ritenute affidabili solo perché "alternative" alla medicina scientifica; il terrorismo sui rischi sanitari dei campi elettromagnetici, che vuole imporre limiti precauzionali ingiustificati, enormemente piú bassi di quelli accreditati dalla comunità scientifica internazionale e adottati in tutti i paesi industriali; il permanere di una condizione di emergenza nel trattamento e nello smaltimento dei rifiuti di ogni tipo, condizione che è figlia del rifiuto aprioristico di soluzioni tecnologiche adottate da decenni in tutti i paesi industriali avanzati; la sistematica opposizione ad ogni tentativo di dotare il Paese di infrastrutture vitali per la continuità dello sviluppo e per il miglioramento della qualità della vita della popolazione; la preclusione dogmatica dell'energia nucleare, che penalizza il Paese non solo sul piano economico e dello sviluppo, ma anche nel raggiungimento di obiettivi di razionalizzazione e compatibilità ambientale nel sistema energetico. Il clima di oscurantismo in atto rischia di contribuire all'allontanamento dei giovani dai corsi di studio a indirizzo scientifico, ormai connotati di significati antiumanitari e antiambientali, alimentando un processo che rischia di prefigurare un futuro di dipendenza anche culturale, oltre che economica, del Paese. La scienza non produce miracoli e non è, di per sè, foriera di catastrofi. Da sempre essa è parte integrante e trainante dell'evoluzione della società umana, motore

Thus, considering these elements of difference and similarity, these states of emergency which produce different political results and decisions are immersed in particular national and local forms of relationships between politics and science. In Italy the relationships between scientific societies and subjects and governmental authorities have been developed and are expressed through a profound conflict, in which scientific subjects claim a major level of autonomy and freedom of science which results, rather, from their perspective, undermined by the forms of obscurantism involved in irrational political decisions and scientific policies of Italian governments.

Particularly the total ban and the affirmation of the political line of zero tolerance to the GM products by the Italian government, since 2000, and the prohibition also of biotechnology research, have tightened the relationships between scientific and political sphere. In fact the GMOs controversy, in the words of the most of scientists which were directly involved in the organisation of the scientific pressure group, intervening with interviews and media communications, the GMOs battle has represented for the Italian scientific community[111] a more extended fight against the general practice and attitude of Italian politics of "politicizing" science, ultimately, in order to

primario di progresso sociale, economico, sanitario e ambientale. Sulla base di questa consapevolezza, scienziati, ricercatori, tecnici di ogni estrazione culturale e di ogni credo, estranei ad ogni interesse industriale e consci del fatto che l'impegno scientifico non deve confondersi con le pur legittime convinzioni di ordine ideologico, politico e religioso, si levano a contrastare questa opera di disinformazione e di arretramento culturale, rivendicando il valore della scienza come fonte primaria delle conoscenze funzionali al progresso civile, senza distorsioni e filtri inaccettabili. Ci costituiamo nel movimento Galileo 2001 per la libertà e la dignità della Scienza, aperti alle adesioni più qualificate, sincere e disinteressate. Chiediamo alle associazioni scientifiche e culturali di impegnarsi disinteressatamente, assieme alle istituzioni, in una indifferibile battaglia per un'informazione competente e deontologicamente corretta. Ci rivolgiamo alla società civile, agli operatori dell'informazione più attenti e ai rappresentanti politici più avveduti perché sappiano raccogliere questo messaggio e ci aiutino a superare le barriere del fondamentalismo e della disinformazione. Vogliamo che il nuovo secolo sia anche per il nostro Paese – che ha dato i natali a Galileo, Volta, Marconi e Fermi – quello della verità scientifica e della ragione, tanto più consapevoli quanto più basate sulle conoscenze e sul sapere. Esse forse non saranno sufficienti, ma sono certamente necessarie". ("Associazione Galileo 2001" 2004:8-9)

[111] Here the emphasis is on the fact that particularly within scientific controversy, in a very ambivalent way, scientific agents, more or less institutionalized in the several scientific agencies, institutions and societies, when are called to describe a situation of scientific controversy, very commonly they speak about Science, with the capital S, ultimately in order to affirm one only, unitary and common position of scientific community. This is the case of the GMOs controversy, both in Italy and in Great Britain, where the 'national' scientific societies and Science have used the element of scientific consensus around GMOs risk as a political support of GMOs enterprise. At the same time, very often with characters of instrumentalisation of science and expertise in policy and politics, within the scientific community the division and diversities between the various fields of scientific knowledge and research are remarked, rather, in order to underline the specific dimension of expertise which is required for any sub-scope of scientific knowledge, reinforcing, ambivalently, the idea of a fragmented and disciplinarily dived science, where who knows about, for example, the general structure of the gene, is not necessary well informed or expert of the different portions of genetic code, and expert in all the set of genes which can be explored in nature. (*Interview*, Larry Reynolds; Bronislaw Szerszynski; Lancaster, November 2012)

legitimating political decisions and for electoral ends, but excluding the '*good*' and '*sound*' science, the 'true' science particularly from the fields of decisions. The conflict between science and politics in Italy is explicit and visible in the GMOs controversy in Italy so much that, for many aspects, the GMOs dispute can be considered mostly as the reproduction of the conflicting relationships between science and politics.

This peculiar form of relationships, in the GMOs case study, between scientific subjects and political actors in Italy is one of the elements that most distinguishes the development of the GMOs controversy, debates and networks of alliances and conflicts from Britain where – in a more profound and long term relationships of reciprocal reinforcement and institutional affirmation between the forms of government and the forms of scientific authority – the idea of scientific consensus around the acceptability of biotechnological risk has been represented as the element on which to reproduce political consensus and to legitimate political decision making. Also scientific and political discourses in Britain very often have been reproduced through a reciprocal support in expressing the common end of persuading public opinion in the affirmation of the imaginary of Britain state as a GM-nation, and legitimating their actions and decisions.

Considering, the situation of conflict in Italy between science and politics in the GMOs controversy, and, rather, the reciprocal reinforcement between scientific and political discourses, actions, and positions in Britain, through the affirmation of the same political line between science and politics in biotechnology enterprise, it is possible to suggest that, in any case, even in the conflicting situation and relationships between science and politics in Italy, the invisible dimension of legitimation of the GMOs policy and decision is still based on the ground of science, thus through a implicit dominance of scientific rationality and knowledge, on the public and other extra-scientific orders of discourse, in the affirmation of forms of scientism both in Italy and in UK, on the level of the legitimation of political and economic positions.

Thus, summarizing the dimensions and perspectives of this comparative analysis, the weaving of political, economic and scientific commitments and interests, in favor or against the GMOs enterprise – by the comparison between Italy and Britain – results to be obscured, in both national contexts, through the affirmation of the dispositive of the state of emergency and necessity of technoscientific certainty/uncertainty in the regulation of the GMOs risk. The claim of not sufficient scientific evidences which cannot permit a decision in favor to GMOs, from the Italian government, and the support of British political institutions to those scientific evidences through which the biotechnological enterprise has been sustained and legitimated so far, represent the bases of both national political decision in the GMOs policy.

The central government of Britain has developed a pro-GMOs position declaring to base its decision and policy totally on the scientific ground and defining biotechnology, in line with the European framework, as a science-based policy; this position has been supported through the general affirmation of a linear model of science in policy and politics, where technoscientific subjects and institutions, firstly the Royal Society, have sustained the strategic scope of biotechnology enterprise as a necessity and an emergency which can be asses and manage through scientific disposition of policy and decision. Political and scientific agreement and scientific consensus have constituted the basis of the legitimacy of biotechnology policy, in the diffusion of public mistrust, disagreement and resistance to GMOs in Britain. This seems to confirm a general tendency in this country for which, beyond the conflicts within the field of science and the ways in which they are treated[112], there seems to be a strong support and legitimacy from science towards,

[112] Here, particularly, I refer to the so-called "Pusztai affair", in the GMOs controversy in Britain, which has been developed as a dispute in the dispute, which began in 1998, following a series of experiments the scientist Arpad Pusztai, which made public the results of their research work, conducted at the Rowett Institute, as there were negative effects with it from GM potatoes on rats, guinea pigs experiment. Directly in front of the media, the scientist, in an interview with Granada Television program World in Action, issued a series of statements that have suggested the risk of GMOs, and then re-opened, if he were ever closed, even from a scientific point of view the debate on the use, in particular in the food industry, biotechnology products. Pusztai claimed that rats fed GM potatoes had several problems of growth and the immune system. After this announcement television Pustzai, raising attention and public concern, has been at the center of the main criticisms of British scientific institutions, primarily the Royal Society and scientific institute where she worked. The media swamped with phone calls the institute, while news blackout that the scientist had been recalled from Rowerett Institute, until the results of his research had not been confirmed or denied by the scientific community. In terms of the social sphere, Non-Governmental Organizations, after this event, proved

in particular, the lines of research and development that are undertaken by the UK government, and it seems to be a stronger reciprocal processes of reinforcement and legitimation between scientific and political institutions and their field of authority.

Rather, the opposite position to GMOs of the Italian government emerges through the conflict between science and politics which has characterized the relationships between scientific Italian societies and governmental institutions in the last decades not only in the field of biotechnology. Concerning the GMOs controversy, these conflicts have arisen within a cultural context and a food culture in which the element of food insecurity comes powerfully to undermine the foundations of the national imagination that characterizes high-quality Italian products. In other words, in the Italian context, unlike in Britain, in the years in which the dispute on GMOs became publically more salient, risk issues and particularly matters related to food crises have been perceived as threats coming from outside of the Italian national territory, as forms of contamination that can undermine the foundations of the quality and the controlled origin of the typical Italian products. The label of "Made in Italy", particularly for the production of typical Italian foods, like olive oil, tomatoes, wine, cereals, and others, represents in the world a sign of high quality and locally.

Rather, in Britain, the GMOs controversy arose in the same years in which British government and citizens were challenged by the food crisis of the BSE disease, which has origin on the same British territory and that has troubled and put in crisis of credibility and legitimacy British scientific and governmental institutions, challenging the national dispositives of scientific assessment and management through the diffusion of the idea of (partial of total) 'scientific ignorance' about the risk of contamination and in the activities of prediction and finding solutions to the spread of the disease and track the remedies. In this sense, the general context in which the GMOs controversy

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increasingly contrary to British policy in favor of the spread of GMOs. The scientist was fired by the Rowett Institute, and the Royal Society, after reviewing the research results of Pusztai claimed that they had no scientific basis, through pubblicazionedei data in The Lancet in October 1999. This case can be considered representative of a series of conflicts, acts of censorship, to discredit divergent positions within the scientific community, and also shows how, in the mid-90s, while the government and British institutions argued that the research led GM to make the risk acceptable, arguing that there was the greatest consensus within the scientific community, in fact, the controversy over GMOs was still completely open and the level of risk uncertain.

arose seems to give the image of a crisis in the British food culture, where, particularly in the recent developments, the element of risk results to be central in the reproduction of social conflicts and public concern.

At the same time, while considering these different national backgrounds, from this comparison several and common elements, characteristics and dimensions can be traced: the plan of the actions and discourses, the arguments of the several political, scientific and economic subjects involved in the biotechnology dispute, which lay on the same discursive level the entire structure of public debate on GMOs, thus through very similar mechanisms which can produce and in fact produce different political results and decision making processes. This set of similarities and analogies seems to come mainly from the common structure of the GMOs policy for which at the centre of power dynamics is placed the issue of the risk through the affirmation of the ambivalent precautionary approach: the reinforcement of a transnational emergency system which domain is defined through the prevalence of practices of assessment, management, prevention and distribution of biotech risk.

Structure and institutional framework of the GMOs policy in Britain and Italy: framing biotechnology national networks and comparative dimensions

In this section I underline particularly the different structural relationships between science and politics in Italy and Britain, considering particularly the different and reciprocal processes of institutionalization in modern democracies of these authoritative structures. Secondly, in order to present the institutional framework within which the GMOs policy is developed in the two compared countries, I tried to summarise the main national institutional structures and authorities, their role and reciprocal relationships in the definition and implementation of the GMOs national policy.

Thus, considering from an institutional and structural point of view, the relationships between science and politics in Italy and Britain have been developed through different historical and constitutional paths. I cannot analyse here the history of the institutionalization of scientific

authority and democratic government in the different phases of construction of modern states. Nevertheless, taking into account a historical perspective, in the study of the relationships between science and politics, it is possible to underline how in Italy, for example, differently than in Britian there is not a predominant scientific society that is publically recognized as the main scientific national independent authority of the country.

This is a deep element of divergence with the British context in which historically the role of Royal Society in the construction of national British identity and governmental legitimation has been crucial in all the constitutional processes of production of British modern state (Shapin & Schaffer 1985). Highlighting this aspect of difference between Italy and Britain it is possible to underline those taken for granted reciprocal and constitutional relationships and reinforcements between scientific and governmental authorities in the reproduction of modern states and in contemporary democracies.

Furthermore and in strict connection with this, within the governmental Italian structures of power scientific advisory institutions are formally constituted on the basis of political careers. Within the British context, the Chief scientific advisor of the Prime Minister, which corresponds to the main scientific authorities within governmental institutions, is usually selected among the presidents of the Royal Society. These different structural relationships between science and politics in these two European countries have been developed through singular historical processes of institutionalization of scientific societies within the national territories and they depend on the diverse role that these scientific authorities have assumed within national territories.

Thus, in the comparative analysis of the production of the Italian governmental opposition to GMOs and focusing on the support of the British government to this field of scientific innovation, this different institutional structure of relationships between scientific and political authorities has to be considered as a constitutional element of national singularity and divergence between these two

European countries. It is a different history of making state (governmental and scientific institutions) in the dynamics of co-production of normative knowledge and social orders.

On the basis of this general diversity between Italian' and British's structures of the relationships between scientific and governmental authorities, it is partly possible to explain the diverse current interactions between scientific and political institutional subjects in Italy and Britain in the specific GMOs case, that is the conflicting situation on the Italian national territory, and the consensual support to GMOs of science and politics in Britain.

Moreover, the GMOs controversy in these two countries is developed through the formation of specific and singular networks of social actors and themes – although considering a series of common international discursive and material elements – which reflects other structural differences between these two national cultures. As I introduced in the previous section, Italy and Britain differ profoundly in food culture and the socio-economic environmental in which the GMOs controversy emerges, and this aspect has influenced the production of the GMOs national policy. Again, I cannot express here nor an exhaustive reconstruction of the economic and industrial structure of the Italian and British agro-industrial sector of the GMOs diffusion, and nor a detailed analysis of these two food cultures. Nevertheless, the Italian total ban to these products cannot be understood if we do not consider, on the one hand, the high value and priority which is attributed, in Italian national food culture, to the quality and controlled origin of food products; and, on the other hand, it appears necessary to consider the particular conformation of Italian agro-industrial economic sector. Although considering the international dynamics of domain of consumptions over the production, in the post-fordist industrial era, within the Italian economic circuits the (national and local) production has a prevalent role over the distribution and in influencing consumption of food products. This means that in agro-industrial sector, in Italy local and national producers determine the development of the chains of food distribution and consumption more than the opposite, that is, rather, when big companies of food distribution determine the production and particularly the

consumption of food, predominantly through the logic of competitive and cheep prizes and a wider choice for the consumers, putting on a second plane the value of quality of food.

These two structural features of Italian contexts appear in contraposition with the general British national background, and the food Italian culture is in general an element which stronger characterizes the Italian national identity than in Britain. The label of 'made in Italy' on food products and the imaginary constructed around the Mediterranean diet (through the national production of its basic elements, such as olive oil, tomato, cheese, wine) can be seen as symbols – within national and international imaginaries – of the high quality and the importance attributed to controlled origin of food in the Italian culture.

Just in explicative terms, this point can be expressed mentioning the example of the Italian movement of 'Slow food'. Slow food is an Italian label which represents a specific lifestyle which regards the production, distribution and consumption of food. In fact, it refers to an attitude of production and consumption which valorises the slowness of these same activities and processes. In the world imagined by Slow food, slowness is a value, and not a disvalues, it is considered as the pre-condition in order to confer the right and fair position to the "good quality food, developing products which respect the environment, and with the vocation of protecting biodiversity and recognize the right to produce and eat slow food"[113].

[113] "Slow Food is a movement for the protection and the right to pleasure. Slow Food promotes, communicates and studied the culture of food in all its aspects. Its mission is to educate the taste, nutrition, science and food. Protect biodiversity and traditional food production linked to it: food cultures that respect ecosystems, the pleasure of food and the quality of life for men. Promote a new model food, environment, traditions and cultural identities, able to bring consumers to the world of production, creating a virtuous network of international relations and a greater sharing of knowledge. (...) The Slow Food philosophy on rediscovery of the pleasure through material culture. The pleasure is food, learned, sensitive, and shared responsibility. To get closer to this achievement, which should be for everyone, it is first necessary to reflect on the slow, recover existential rhythms compatible with a quality of life that must be total. (...) To say pleasure is to search food production lens, rich in tradition and in harmony with ecosystems, is defending the Slow knowledge, which disappear along with the culture of food, means working for the sustainability of food production and thus the health of the Earth and people's happiness. The transition is not immediate, but the story of Slow Food proves it. From wine and food to eco-gastronomes, to act as a neo-gastronomes struggling with food culture, in all its chaotic complexity that involves our lives and the lives of everyone in a network of knowledge and tastes that concern only the food, but it is closely affected. Slow Food is aware that one of the central issues, including the challenges it confronts us with the post-modernity, is the system of production, distribution and consumption of food. Standing on the side of those who produce, distribute and consume in a good, clean and fair, the system can change, and make us all happy, not hectic, not approved, not alone. Slowly, Slow Food is working to have more beauty, more

Slow food supports sustainable practices of production and consumption, and more generally a way of life which incentives an agro-industrial sector based on a policy of "chilometro zero", protection of biodiversity and there is a particular emphasis on the 'biologic' and 'natural' origin of food products, which means that from slow food's perspective, the production should tend to exclusion of the use of pesticides and agents of genetic mutation. The lifestyle affirmed through the label of slow food can generally represent the imaginary of the Italian food culture particularly on the international level. The specificity of the Italian national and local food cultures is also connected with the character of 'pleasure' – and not only as an irreducibly human need – which is connected to food.

Considering, rather, the British case, I particularly focused on the fact that in this country the GMOs policy emerged within a context of crisis of public authorities: particularly in the period of emersion of the GMOs national debate, both scientific and governmental subjects in Britain are involved in a crisis of legitimacy connected to the different events of food risk and crisis, as for the case of the BSE. In strict connection with this, I argue that in Britain the dimension of risk and security as predominant in the reproduction of national GMOs debates is stronger than in Italy: this is because of the environment of food crisis of British national context, and also because, as I mentioned above, in Italy seems to be the attribution of a higher value to the quality of food products than on the aspect of GMOs risk.

The recent history of the relationships between scientific authority and public food security in Britain is characterized, particularly in the nineties of the last century, through a moment of crisis of public legitimacy of these institutions and of governmental structures. The case of the BSE symbolises, in this sense, a general phase of food crisis in this country focused on questions of risk; this is extendible to the whole Europe context, but clearly there is stronger impact within British

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pleasure, more diversity in the world. So that everyone can enjoy their land and its fruits, because everyone has the right to their own dietary freedom in full fellowship and in compliance with the planet on which we live". http://www.slowfood.it/.

national context. The development of this case of risk and disease has influenced deeply and in a peculiar way both the British and European reproduction of the GMOs policy.

When in the spring of 1996, the British government announced to public opinion that the ten cases of incurable neurological disease, Creutzfeldt-Jacob disease (vCJD), were caused most likely from the consumption of beef affected by BSE, the whole British scientific system of food security, and the entire European public opinion, has been put in crisis: looking at the public communication of governmental subjects, by British media, the BSE [114] is identified as the case of "socio-environmental hazard" which has mostly worried European and British population, and considering particularly the media impact and coverage on this issues, this case has had the highest attention of the institutions especially concerning question of public mistrust[115] in regard to British scientific and governmental authorities.

Basically, considering these general structural elements, the aim here is to underline the differences between these two national food cultures: I emphasise how, on an imaginary scale of value, the

[114] Since the mid-80s of last century, when the first case of BSE was detected by scientists in Britain, have developed a series of scientific research in order to understand the causes, effects, remedies and cures track, the general ignorance in which poured the national scientific community. Upon the announcement by the government there was no line of policy that could be suggested by science to political institutions in order to avoid that the food crisis was interpreted by the public as unmanageable. Further scientific studies needed to understand the connection between the deadly diseases found in animals and in humans, this urgency and emergency in which the British government was necessarily to intervene. However, the scientific ignorance in which the crisis caused by BSE found itself to be managed, produced British public opinion a strong level of confidence, concern and has to some extent fueled the development of a certain level of distrust of institutions public, in particular a lack of confidence in the assurances of the government that followed the announcement, in which he expressed the containment of health risks on the part of governmental authorities, although it was obvious to the contrary, which is the complete ignorance of the scientific was happening. Similarly, in the case of GMOs, public mistrust towards the security guarantees of biotechnology products derived from the public discourse of the government has characterized the debate and controversy over GM crops in Britain. However the food crisis linked to BSE the scientific element of ignorance about the effects and risks of GMOs, was absolutely denied, in the sense that it has developed a policy based on scientific evidence grueling the acceptability of the level of risk arising from the spread of certain GMOs into the environment and the commercial circuit. The scientific consensus of the main subjects of science has determined the level of legitimacy of the policy, while remaining open debates and conflict on the side of the social body. This is the framework within which the regulatory and policy decisions related to GMOs emerge in Britain, by diffusion processes of public mistrust, warning and emergency general as regards issues related to nutrition, food, and safety of such products. Public distrust in science, the scientific question of ignorance, particularly in relation to food and to the risks arising from the products of science itself, in the year of emergence of British and European regulation of GMOs resulted in any debate on this issue.

[115] The food crisis resulting from the spread of BSE, and as a general scenario within which to place the emergence of the dispute on GMOs, as a case study is comparable to a lot of similarities with the policy on biotechnology, can be understood as an example of "policy science" where, "Typically, facts are uncertain, value in dispute, stakes large, and urgent decision". (Ravetz, 1987: 81)

quality of food is what characterises the Italian context, and rather, for Britain, safety/risk and cost-benefits, in terms of price.

In all highly industrialized societies it is increasing impossible to have full information on all the steps through which food is produced; in this general sense the issue of security and risk of food, on a global dimension, is central in the determination both of questions of quality of food and quantitative production and benefits in terms of price. Following this interpretative scheme, in the Italian national culture, for the different traditions of local agricultural production and the different typical culinary traditions on regional and local dimension, this aspect remarks the dimension of quality of food as more powerful symbolic element of national cultural identity.

In any case, the supranational political and cultural context of the years of developing of the GMOs controversy, in the mid 90s of last century, and later in Italy, is constitutively marked by a crisis in the scenario of scientific, political and economic management of food; this feeds a climate of diffused public mistrust not only regarding particular industrial practices in food production, but also concerning the scientific and governmental management of this kind of 'risk' policies. In this sense, beyond the BSE crisis, the debates on biotechnology at the international level, emerge and let to proliferate discourses on security and food sovereignty of peoples and citizens, as the expression of the freedom to know what we are eating, but even before that, the right of everyone to eat[116].

Considering these structural and institutional elements of comparison between UK and Italy, for both these two national contexts, I tried to reconstruct the main institutional subjects and categories of social actors involved in the GMOs dispute, considering in each case the different roles and different positions which these social subjects take within its territory. Thus, in order to reconstruct

[116]These risks and uncertainties, the issue of hunger in the world connected with biotechnology is a recurring motif, in particular, for all those people, political, scientific, economic, and supporting the development of these technologies in agriculture, supporting the idea when world population is increasingly growing, and the whole slice of the world's hungry could be fed from product development gm in agriculture. This is a common point that I found both upstream and downstream of the comparative analysis. For Italy, it is interesting to note that this is one of the main reasons brought by representatives of the Catholic Church in supporting its support to the development of biotechnology in agriculture.

the biotechnology network and the processes of regulation of GMOs in Italy and in UK, I identified the following categories[117] of actors in common to both the two national contexts: a) political actors, b) scientific actors, c) economic actors, d) legal actors, e) NGOs f) category of citizen.

Below I composed a list of key institutions, political and scientific authorities relating both to the Italian and British contexts which I considered in the development of the two national cases study and in this comparison. This presentation of the main scientific and governmental authorities results to be essential in order to identify the structures within which the relationships between science, citizens and politics have place, and also in order to highlight the dimension of institutions making which is implied in the development of the GMOs policy in both countries. Considering this possible plane of generalization, this presentation is useful in order to take into account the dynamics reciprocal legitimation between political and scientific authoritative structures within contemporary democracies. Thus, the main question in the following pages is: what are the scientific structures through which (biotechnology) risk disputes are tried to be handled by governmental institutions?

Regard to the British context, I particularly focused on the actions, practices and discourse of the following institutions: prime minister (considering the provisions, actions, documents and statements which come from the government cabinet). In the institutional British framework, differently than in the Italian establishment of government, a key role is played by the relevant figure of the Scientific Adviser Chief of the UK Government, the 'scientific-political' subject closest to the British prime minister, who acts as an intermediary between scientific advisory bodies and the British governmental establishment (including the Prime Minister's Office and considering its role of information and coordination of scientific advisory coming from different scientific institutions internal and external to the establishment of government). This is the institutional body

[117] Considering these are ideal-typical types and models, such categorizations, not only do not cover the landscape of social components involved in the dispute on GMOs, but are not consistent with the material structure of relationships and interweaving areas and spheres of social action, where the boundaries between these are rather to be confused and in many cases indistinguishable, in particular as regards the role, structure and functions of scientific authorities within state institutions (and in particular in the UK and European institutional framework).

who leads Prime Minister on ‘scientific’ matters, informing and suggesting trajectories of policies to adopt at the national level. The scientific adviser chief has the role of determining, directing and coordinating the construction of innovation, research and development policy; and the credibility of the positions and statement of the prime minister concerning technoscientific discourses and arguments is strictly connected to the credibility of this scientific figure which confers legitimation to the political plans, policies and decisions.

Regarding particularly the dimension of public investment to private companies in the different economic sectors of application of biotechnology, in Britain, unlike in Italy, the development of biotech enterprise has been a subject of high relevance for the Ministry of Trade and Industry and for the Department of Trade and industry (DTI): since 2007, this has been restored and converted in the Department of Business, Innovation & Skills (DBIS), and this transformation suggests how the British institutional governmental establishment in its recent evolution is reflecting the dominant vision of knowledge democracies and knowledge economy, essentially based on the linear idea and model of scientific innovation, research and development as human progress. Still concerning biotechnology investments in UK structures of governments, I also consider the trajectories of funding determined by the Ministry of Economy and Finance UK, HM Treasury.

Within these departmental structures, in the full Italian version of this dissertation I developed the British case study focusing particularly on the role of the biotechnological and biological sciences Council which predisposes the investments in biotechnology; the Biotechnology and Biological Sciences Research Council, which in the last decade has taken the place of the Agriculture and Food Research Council (AFRC): this is a strong signal, in the British institutional structure, of the support of the British government to the GM technology in the agricultural sector.

This council has been formed as a semi-independent body from the government, but it operates from within the government structures and according to the purpose and the lines expressed by the Prime Minister’s Office. The process of funds’ attribution and for the budget destined to science

and technology is mainly directed under the DBIS. Nevertheless the role and above all the transformation of this council has to be read as a crucial element in this reconstruction of the practices of institutions making connected to the development of the GMOs policy. in the UK, the BBSRC was created in 1994, taking the place of the Agricultural and Food Research Council (AFRC), and in this shift I see a specific peculiarity of British institutional context, which places this country in a different position respect the Italian institutional adaptation to the advent of biotechnology: in fact, this transformation puts biotechnology products at the center of agricultural processes.

From the point of view of the scientific risk assessment and management, according to the European level, the GMOs policy is developed through the Department for Environment, Food and Rural Affairs (DEFRA): this is the ministerial institution that has the main role in the formation of the scientific information and evidences which are used in support to the political decision on GMOs in Britain. In short, in Britain anyone who wants to release GM product into the environment for experimental ends, in agreement with the European system of GM authorization, must obtain a formal permission which regard the national scientific DEFRA risk assessment and management. As it is expressed by this department: "*applications for approval a product to market (including crop seeds for cultivation, foods or feeds) are assessed and decided upon at EU level, while applications to release a GM organism for research and development purposes are considered at national level (by DEFRA for proposed releases in England, or by the relevant authorities in Wales, Scotland or Northern Ireland)*"[118]. The process of scientific assessment for the release of GMOs or more in general, in terms of patents, for the commercialization of biotechnology applications, takes into account potential safety factors relating toxicity, allergenicity, and the possibility of contamination and possible transfer of new genes with other organisms. DEFRA is a governmental institution, but in its role of scientific advisor it is considered as composed as an independent and neutral body respects the government and politics.

[118] http://www.defra.gov.uk/environment/quality/gm/

Closely related to the work of DEFRA, the GMOs policy in Britain is structured through the Advisory Committee on Releases to the Environment (ACRE): this has been established as a specialized committee in the analysis of the biotechnology contamination and risk relating to the spread of a series of experimental GM products within British contexts. ACRE is a scientific committee internal to the federal state, but it is claimed as composed by independent groups of scientists who work in order to provide information, advice and to develop scientific risk concerning the GMOs impact on the biodiversity and on the different environments and micro-ecosystems. This body is designed to provide guidance and lines of action to the British government, and through this institution the composition and implementation of the farmer scales in Britain have been predisposed. ACRE operates as special body of DEFRA, supporting this department in the development of analyses of each application in the biotechnology sector. These structures have the authority to decide whether or not to allow the release of different products gm, for experimental ends, and if the risk management can be guaranteed or not. As I mentioned above ACRE is intended to be an independent body composed of leading scientists particularly in life and environmental sciences. On the basis of this independence, the main function of this committee is to provide scientific advice to government structures, ministries[119], managing issues relating to risks, to human health and particularly on the environment, coming from the release of GMOs.

As it is possible to observe through this short list of the principal governmental structures in the GMOs policy and decision making in the UK, from a structural point of view British context has transformed its institutional environment in order to adapt British government to the emergence of

[119] The GMOs policy regards and challenges different public institutions and departments; in this sense, the central government, looking particularly at the institutional structure of the relationships between science and politics in Britain, has been supported and have found the support of the Ministry of Health, the Department of Health (Public health, adult social care, and the NHS). This department, despite having repeatedly expressed by mentioning a number of reservations and reasons for caution in the spread of GMOs, in particular, in food chains British considered the biotechnology policy in Britain based on the evidence provided by the specialized committees and inter-ministerial who have achieved very accredited, and thus fully legitimate and shared by the entire establishment of government. Similarly proceeded and acted strictly in accordance to the office of the British Prime Minister, the executive body called the Health and Safety Executive (HSE). The health department is especially concerned nell'applicazioni medical GMOs, work regulation and licensing processes in which products are included gm. In this sense, The Health and Safety Executive is responsible for the completion of licensing and regulation, however, the authorization to proceed is only guaranteed once the risk assessment has been developed dall'ACRE.

GM products. At the same time, new institutions have been constructed through the processes of political definition of biotechnology. As in the case of the institutionalisation of a specific regulatory committee on GM food, the UK Regulatory Committee on GM Foods, and the consultative commission relating to the patents on novel foods, the Advisory Committee on Novel Foods and Processes[120] (ACNFP): these processes of institutions making can be considered as specific examples of these dynamics of creation of new institution of scientific-political-legal organization of innovation in life science.

Concerning the dimension of analysis relating to the relationships between citizens, science and politics, and considering the element of democracy of science-based policy, in the study of the British national case study, I focused also particularly on the peculiar history of the institutionalisation of the Agricultural and Environment Biotechnology Commission (AEBC).

The AEBC was constituted as an independent committee which has been created in order to provide to the British government and administrative departments different strategic perspectives of political and governmental analysis concerning the GMOs controversy. In general, this body has been built in order to better define institutionally public biotechnology[121] imaginaries particularly in the agro-industrial sector and as regards the effects of GMOs on the environment.

The AEBC was established in June 2000, following the "review (1999) by the Cabinet Office & the Office of Science & Technology of the Advisory & Regulatory Framework for Biotechnology"[122], in "difficult years" for the GMOs controversy in the UK. In effect, this hybrid institutional formation has been constituted after the emergence of some national surveys and reports about British public attitudes toward GMOs, stimulated by private companies and NGOs. These public surveys, aimed to identify the attitudes of the consumers-citizens towards GMOs, had the public effect to stimulate questions of governmental account of public concern about the British

[120] This committee has been developed under the Food standards Agency (FSA).
[121] In the construction of the GMOs policy, this committee had to work closely with the Human Genetics Commission (HGC).
[122] http://webarchive.nationalarchives.gov.uk/20100419143351/http://www.aebc.gov.uk/aebc/about/about_us.shtml

management of the GMOs policy. In this organisms have been involved different categories of policy makers and stakeholders, and its constitution is also linked to a series of events of social frictions and conflicts and public demonstrations which pushed British government to create this institution in order to extend the democracy in the processes of GM policy and decision making. Thus British national authorities have developed this 'Joint Committee', within which different social actors have been involved: scientists in the field of biotechnology, social scientists, members of NGOs and representative of economic categories[123]. As for the other scientific advisory body within the governmental structure of power, this commission was established as an independent organism, and as able to provide strategic advice to the British government on the development of biotechnology and considering particularly its applications in agriculture.

The distinguishing feature of this institution is its constitutional approach to look at "*the broad picture taking ethical and social issues into account as well as the science*"[124]. In short, the foundation of this institution with this extended basis can show how, in Britain, in the development

[123] Among these, to chair: Professor Malcolm Grant, Provost and President of University College London, and as members of the Committee: Julie Hill, MBE, Programme Adviser and former Director of Green Alliance, an environmental think tank particularly influential in the territory British; Anna Brandley, Consumer Affairs Director for the Financial Services Authority; Helen Browning, OBE, Tenant Farmer, Eastbrook Farm, Founder and Director of Eastbrook Farm Organic Meats Ltd; Davidi Buckeridge, Business Director of Advanta Seeds, responsible for European and North American operations, David Carmichael, MBE, Arable farmer with an interest in non-food crops; And Dart, CBE, Chairman of Plant Bioscience Ltd, Matthew Freeman, senior researcher at the Medical Research Council Laboratory of Molecular Biology, John Gilliland, OBE, "President of the Ulster Farmers Union and arable farmer with a Particular interest in sustainable production systems and the pioneering of non-food crops "Robin Grove-White, Professor of Environment and Society at the Institute for Environment, Philosophy and Public Policy at Lancaster University; Rosemary Hails, MBE, Ecologist and Principal Scientific Officer, Centre for Ecology and Hydrology Oxford and lecturer at St Anne's College, Oxford, Judith Hann, a Freelance broadcaster and writer who presented Tomorrow's World for 20 years, Derek Langslow, CBE, Scientist specialising in nature conservation / biodiversity and former Chief Executive of Inglese Nature; Keekok Lee, Visiting Chair in Philosophy, Institute for Environment, Philosophy and Public Policy, Lancaster University, Jeff Maxwell, OBE, Former Director, Macaulay Land Use Research Institute, Sue Mayer, Executive Director of GeneWatch UK, Paul Rylott, Former Chairman of the Agricultural Biotechnology Council (ABC) and former Head of BioScience at Bayer CropScience UK, Justine Thornton, Barrister specialising in environmental law at Allen and Overy Solicitors. As can be seen from this list of names and professions, the AEBC has been characterized as a broad arena of public debate in which they were present the voices of ecologists, environmentalists, farmers' representatives, natural scientists, social scientists, reporters, particularly attention on the case of GMOs, as representatives of GeneWatch, NGOs like Green Alliance, social researchers closer to Green Peace, as Robert Grove-White. This shows that the opening of discussions took place through the channels developed by Unilever and Green Alliance has produced the need to involve the institutions of government, albeit with an independent commission, and put them in contact with different individuals, and not only technical and scientists. Not surprisingly, many individuals members of the contact group set up by NGOs and multinational listed as members of the AEBC. As subjects present within this committee, and as scientists, each operating in its own field, in the course of fieldwork, including actors I interviewed, Professor Robin Grove-White, and Rosemary Hails ecologist, who is also a member dell'ACRE, and particularly informed about the different dynamics of the formation and communication within the processes of regulation of GMOs.

[124] http://webarchive.nationalarchives.gov.uk/20100419143351/http://www.aebc.gov.uk/aebc/about/about_us.shtml

and diffusion of social conflicts connected to the scientific, political and economic management of the GMOs policy, there is the manifestation of the emergency to re-equilibrate the scientifised GM debate, constructing hybrid institutions with the end to armonise conflicting public meanings.

The moment in which it emerges and the tangled structure of this committee (which was suspended in 2005) makes the experiment of AEBC an element of singularity of the UK institutional context. In fact, the commission seems to be emerged in the climate of social tension and conflict produced by divergent positions on GMOs within the British social context, in order to find a space in which construct plans and strategies of construction of public consensus.

The creation in 2000 of the AEBC, around two other "super-commissions" on biotechnology and GM food (the Food Standards Agency), and on human genetics (the Human Genetics Commission) was the explicit response of the government to the disaffection of the public awareness of science, expressed by the controversy over GMOs, and in order to preserve the direct interests that could come from the industry, and through the narrowing of the socio-economic-political network around the scientific advisory committees, which de facto operated as regulatory decision-making committees. The AEBC reproduced, in its short existence, a microcosm of the wider social conflicts around the theme of GMOs. Within the boundaries of the AEBC, in any case, it is possible to argue that tangled work between this different stakeholders, social scientists and members of NGOs, has not produced any effect on the decision making of British government. Also, it is arguable how this organism has been composed by British governmental authorities partly as an institutional answer to the diffusion of scientific reports on British public attitudes to GMOs, promoted by Uniliver and the NGO Green Alliance, from which, through social scientific analysis, public concern and mistrust were shown, and also it has been shown how public governmental institutions were producing the GMOs policy without considering public concern, which was emerging from different public consultations. Responding to this 'accuse', coming from a very singular and peculiar channel of policy making, British government has constitute this commission; nevertheless,

there is not contact between the 2004 governmental decision of the British government and the analyses produced by the AEBC. In the final communication of the AEBC[125], through the agreement of all the members, it has been expressed how:

> There is a general feeling that the AEBC was a body created for a particular time. It has now largely discharged its remit, having had a significant influence on the UK Government's current approach to genetically modified crops. However, there is also eagerness to ensure that the legacy of the AEBC – its remit, ways of working and breadth of membership – is sustained in some way after its end. There is agreement that Government should respond to the review quickly and decisively. (Biotechnology commission members' reaction to the review and the future of the AEBC, London, 18 January 2005)

Thus, going back to the reasons of its development, the first report of the AEBC "Crops on trials" (10 September 2001) presents the history of this commission:

> The need for independent strategic advice on developments in biotechnology and their implications for agriculture and the environment emerged from the Government's review of the advisory and regulatory framework for biotechnology. The main concerns expressed during wide consultation were that the current arrangements were complex and difficult for the public to understand, did not properly reflect the broader ethical and environmental questions and views of potential stakeholders, and were not sufficiently forward-looking for a technology which was developing so rapidly. The Government concluded that the existing regulatory and advisory committees should continue to consider whether to grant approvals for individual products or processes, in the context of protecting the health of the public and protecting the environment. But there was also a need for a strategic framework for the overall development of the technology in the UK, to reflect the broader ethical and environmental concerns of society and to consider the future implications of biotechnological developments. The Agriculture and Environment Biotechnology Commission was set up to help provide this (*Crops on trials*, AEBC Report, September 2001).

As it is possible to read from the section of "*Crops on trials*" dedicated to the presentation of the AEBC members, the composition of this commission results to be very variegate and it includes: Malcolm Grant (Chair), Professor of Land Economy at the University of Cambridge; Ms Julie Hill MBE (Deputy Chair) and Programme Adviser and former Director of Green Alliance; Michael Banner, Professor of moral and social theology at Kings College, London; Ms Anna Bradley,

[125] The last communication of AEBC has been its response, after publishing an independent review in 2005, an reactions to the review impact on governmental decision about GMOs and the decision to wand up the commission at the end of April 2005, just a year later Beckett's GM speech.

Director of the National Consumer Council; Ms Helen Browning OBE, Tenant Farmer, Eastbrook Farm; Founder and Director of Eastbrook Farm Organic Meats Ltd; Dr David Carmichael, Arable farmer concentrating on seed production from combinable crops; Philip Dale, Leader of the Genetic Modification and Biosafety Research Group at the John Innes Centre, Norwich; Dr Ed Dart, CBE Chairman of Plant Bioscience Ltd; Dr Matthew Freeman, Senior Researcher at the Medical Research Council Laboratory of Molecular Biology; Mr John Gilliland Arable farmer with a particular interest in sustainable production systems and the pioneering of non food crops; Robin Grove-White, professor of Environment & Society, and Director of the Centre for the Study of Environmental Change, Lancaster University; Dr Rosemary Hails MBE Ecologist, and Principal Scientific Officer, Centre for Ecology and Hydrology, Oxford and lecturer at St Anne's College; Ms Judith Hann, Freelance Broadcaster and Writer who presented Tomorrow's World for 20 years; Ms Chi Iweajunwa, Member of executive evaluation group for NHS Direct, and member of Partners Council for NICE (National Institute for Clinical Excellence); Dr Derek Langslow, Scientist specialising in nature conservation/biodiversity; Professor Jeff Maxwell OBE, Former Director, Macaulay Land Use Research Institute; Dr Sue Mayer, Executive Director and Board Member of GeneWatch UK; Professor Ben Mepham, Director of the Centre for Applied Bioethics at the University of Nottingham and Executive Director of the Food Ethics Council; Ms Justine Thornton, Barrister specialising in environmental law; Dr Roger Turner, Chief Executive Officer, British Society of Plant Breeders.

As Robert Grove-White, member of the commission, argues (Interview, April 2011), the reaction of the governmental authorities to the several reports and considerations produced through this commission were not taken into account from the British government in the development of the GMOs decision making. In line with that, the AEBC has interrupted its work, in 2005, most probably because its way to management the GMOs policy was going to open public debates to other and controversial political questions – matter of democracy and public participation in scientific policy –, and because this institution has been identified, from several part, as too close to

public concern more than how principals pro-GMOs stakeholders were agreed to permit (Doubleday, Wynne, in Jasanoff 2011).

The distinction between scientific bases of the GMOs policy, conferred to the British governmental GMOs decision through the different experimental activities promoted and founded by the UK state, and *other* not scientific elements which emerge through the diffusion of biotechnology enterprise and innovation, is particularly stressed in the British national case study, and it is particularly visible in the considerations of British politician of AEBC. In the communication of the British decision about GMOs, in 2004, the AEBC is mentioned just "*apart from the scientific decisions*".

> Apart from the scientific decisions which flow from the trials there is the related issue of GM and non-GM crops being grown in the same area – so-called coexistence. And the AEBC has recently produced advice on this issue. I propose that, as the AEBC advise, farmers who wish to grow GM crops should be required to comply with a code of practice based on the European Union's 0.9% labelling threshold, and that this code should have statutory backing. There are particular concerns of course for organic farming to which the Government has much increasing funding and to which we remain committed. The AEBC argued for a lower threshold for organic farming but could not agree on a figure. We will explore further with stakeholders whether a lower threshold should be applied on a crop-by-crop basis. I will also consult stakeholders on options for providing compensation to non-GM farmers who suffer financial loss through no fault of their own. But I must make clear that any such compensation scheme would need to be funded by the GM sector itself, rather than by Government or producers of non-GM crops. (Beckett's GM speech, The Guardian, April 2004)

The approach of the British government to the GMOs policy, although considering the different and peculiar experiments of public engagement with science, public consultation, extended commission, as the AEBC, remains based on the predominance attributed to scientific evidence as special elements of decision making. In fact, the basis of the discourse of the governmental British forces sustains how "there is no scientific case for a blanket approval of all the uses of GM. Safety, human health and the environment must remain at the heart of our regulatory regime and rigorous and robust monitoring must be maintained. But equally there is no scientific case for a blanket ban on the use of genetic modification. I know of no one who argues, for instance, that the GM tool alone can solve the problems of the developing world. But it is less than honest to pretend, especially

against a background of climate change, that GM has not the potential to contribute to some solutions". (*Ibidem*) From this position emerges how the public dialogue and public concerns are marginal and taken as apart from the domain of science in the GM policy.

Considering this experience of (hybrid) institution-making in Britain, and regarding this disposition of the institutional relationships between scientific and political structures and agents, in this comparison I observed the differences between Italy and Britain which emerge through the historical affirmation of diverse roles of the national scientific societies in these two countries.

In Britain, the Royal Society is characterized as an autonomous and independent scientific institution formed by the association of "*many of the world's most distinguished scientists drawn from all areas of science, engineering, and medicine. The Society's fundamental purpose, as it has been since its foundation in 1660, is to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity*"[126]. On the one hand, the emphasis is on high quality research within the British scientific community, on the other, the accent is on the fundamental role the academy plays in the development and use of science in society. In addition, among the priorities of the Royal Society, together with the promotion of scientific knowledge and the benefits derived from these excellence and innovations, there is the role of support and specialist advice in the production of the policy of the British government: "*provide scientific advice for policy, foster international and global cooperation and education and public engagement*". It has the three main roles: RS represents the British academy of sciences that promotes all scientific disciplined, and a scientifically educated society, working also and as an agency in founding scientific research[127].

For the purpose of this analysis can be interesting to note that the Royal Society has been recognized by the British government, repeatedly and officially, as the competent institution and

[126] http://royalsociety.org/about-us/
[127] "*The Society has three roles: it is the UK academy of science promoting the natural and applied sciences, a learned society, and a funding agency*". http://royalsociety.org/about-us/

highly accredited in the functions of scientific advice, in particular on the most controversial issues and related risk management. In this regard, in recent years, within the Royal Society the Science in Society Advisory Committee has been constituted, which involves as members social scientists and other stakeholders engaged in the reproduction of public and scientific meanings about public scientific controversies.

These institutions and subjectivities do not cover the full institutional network of the relationships between British governmental actors and scientific institutions, and in any case these relations needed to be connected to the actions and positions of a number of economic actors, and to the role of NGOs. Thus, in this account on the institutional framework of the GMOs network it has to be considered the role which multinationals like Monsanto, Syngenta, Unilever, and Sanisbury's play more implicitly within institutional areas of policy and decision making, as influential economic interest groups, that shape national decisions. At the same time, in these dynamics of institutions making, I considered crucial also the relationships between governmental structures and NGOs like Greenpeace, Friends of the Heart, Green Alliance, Ya Basta: the actions of this social actors result to be essential, in this account, in order to understand how and why the formation of some institution has been institutionally required.

Referring to the Italian political-institutional context, the main actors and the authorities that I have considered are: the Presidency of the Council of Ministers, which plays a function of coordination and direction of the activities of individual departments. Within the presidency of the government, a independent scientific body of political support about biotechnology decision has been established, in 1992, the National Committee for Biosafety, Biotechnology and Life Sciences (CNBB), which aims are the formation of programs of coordination, harmonization and integration of the different initiatives and activities of ministries, agencies and public and private organizations in the field of biotechnology. This committee was set up originally in order to ensure uniform and homogeneous forms of intervention on the Italian territory.

In the reconstruction of the Italian case study, I considered, among the ministries particularly involved in the GMOs regulation in Italy, the Ministry of Health, in particular because in the first phase of the Italian GMOs policy development, this department was considered the institutional governmental structure responsible for the production biotechnology policy, although in agreement with other departments.

Considering the evolution and modification of the GMOs regulation's institutional structure and also the practical and emergency acts of Italian government in the GMOs policy making, the Ministry of Agriculture, Food and Forestry, had and currently has the main role in the development of the GMOs policy, not only in the agricultural sector; in fact, this department has competence and is responsible for environmental issues related to the spread of GMOs, but these activities are coordinated together with the Ministry of Environment and Protection of territory.

In the Italian GMOs controversy, the normative acts produced by both these departments, particularly in the second phase of development of the GMOs policy, are those that have had the greatest impact in the dynamics of the GMOs policy and decision making, and in determining the conflicting relationships between scientific and political subjects in Italy. In particular the Ministry of Agriculture, as it emerged from the analysis of the Italian GMOs policy, has produced those restrictive rules and bans toward biotechnology that have supported the production of the Italian policy of zero tolerance to GMOs. In this sense, the emergency decrees from this department are at the heart of the conflicts between Italian scientific subjects and governmental institutions. Moreover, underling the activities of these departments, and their emergency character, it is possible to focus the attention on those constitutional and institutionalised form of restriction of democracy which are involved in the emergency development of the biotechnology controversy in Italy.

Within the Italian State, the Ministry of Agriculture [128] is responsible for developing and coordinating the GMOs policy guidelines and its role is particular salient in the activities of coordination of a series of connected bodies, such as the Agency for Disbursements in Agriculture (AGEA), the National Institute of Agricultural Economics (INEA), the National Research Institute for Food and Nutrition (INRAN), the Agribusiness Development Institute (ISA) and the Institute for Agricultural Market Food Services (ISMEA).

Thus, the Agriculture department, the Ministry of Health and that of Environment are the three governmental institutions through which the GMOs policy is bureocratically and administratively coordinated, particularly concerning decisions on the GM release for experimental and commercial ends. Considering the European level of scientific assessment and management of the GM risks, the Italian measures provided for obtaining authorization in Italy are based on the collection of sufficient scientific evidences relating to the GMOs toxicity, allergenicity and contamination. Considering the general opposition of the central and regional governments to the spread of the GMOs, the Italian system of GMOs authorization results to be also connected to particular kinds of permissions which have to take into account questions linked to the protection of agrobiodiversity and the specificity of local agricultural products.

These three ministries, health, agriculture and environment, are the leading authorities in the GMOs regulation in Italy. In the early phase of the biotech policy development, the Ministry of Health was the national authority responsible for the coordination of administrative, technical and scientific GMOs risk assessment and management, with the function also of coordinating authorizing procedures for the release of GMOs on Italian territory. I underline this institutional shift in order to emphasize how, within the Italian borders, the GMOs controversy, from an institutional point of

[128]The research activities of priority interest for the Ministry of Agriculture are due to the enhancement of the food chain for consumer protection, the strengthening of the productive system and the agro-industrial development of new tools for training and the transfer of innovations in agriculture; by such interests, the determination of the effects on human and animal health arising from the use of GM foods has become the core of agricultural policy in the field of biotechnology in warmer years of the dispute.

view, has been conceived mainly, on the one hand, human health security[129], excluding the possibility of introduction of these products in the circuits agribusiness and food; and only later as a matter related to the risk of contamination and reduction of the Italian food quality.

In effect, particularly since 2003-2004, the issue of environmental and food security started becoming particularly relevant (even) in the Italian system of the GMOs regulation, in coincidence with the end of the EU moratorium on GM products. This produced the adaptation of the Italian GMOs institutional structure in terms of environmental protection and the shift of the GMOs regulatory responsibility on the ministry of Environment[130]. As I reported in the full Italian version, by the legislative decree n. 224 of the 8th July 2003 (implementation of directive 2001/18) there is this institutional modification in governmental department on which the GMOs regulation is particularly concentrated, and in this same date a new inter-ministerial commission ad hoc has been established as that national expert authority responsible for implementing the new Community legislation (Article 2) on GMOs.

In this structure of the GMOs regulation institutions within the Italian state, I also considered the role [131] of the Ministry of University and Research, as the department responsible for the

[129] For the UK we have the Department of Agriculture to the environment. This difference of departments may be useful to describe the different structural arrangement between the two countries and how this might influence the development of public policies in different contexts: the emphasis is placed in Italy, in particular, the safety of persons, while in Britain, where the possibility of the spread of GMOs is the preferred hypothesis of the British government, the emphasis is on the regulation of GMOs in the environment once. For Italy it is more than a matter related to technical and licensing in the medical field, in the UK the business is the economic principle understood on different levels of application of biotechnology.

[130] This change, in terms of institutional authority, is significant, first, the most extensive transformation and European trends taking place in that particular phase, ie the stress food security for the people of GMO products, and further verification, in many European countries, for their safety (also on the side) environmental contamination, through technical and scientific evaluation of the effects of the release of GMOs into the environment. Moreover, the growing awareness, in those years, to environmental issues, particularly those related to the issue of GMOs in national debates and international, played a role in climate change generally, the shift of the competent authority of GMOs. From this perspective, the construction of biotechnology policy in Italy, if reinterpreted in the light of regulations issued by the government, can be described: for his constant opposition to GMOs in terms of rhetoric and media discourse and, nevertheless, to its urgency and the continuing delay in the implementation of Community provisions, decrees translated into 'emergency' and often frustrated, shortly after their implementation, standards produced by the subsequent evolution of Community law and the various events that followed one another throughout the country.

[131] I explored the role of these different departments in relation to the Italian economic dispositions in GMOs matter which come from the Ministry of Economic Development, in its role as development and coordination of national policies in the field of industry, trade, energy and commerce, and in relation to development programs and territorial cohesion, is the establishment of ministerial government within which are developed activities related to the Italian

development and coordination of scientific policies in Research and Development, together with and trough the collaboration with the national Research Council[132] (CNR) in the formation of the main national research programs and projects.

Within this structure, particularly regarding to the Italian national mechanisms of scientific risk assessment and management, in the Italian context have been established: a scientific committee to the risks arising from the use of biological agents, the National Committee for Biosafety and Biotechnology, and the Bioethics Committee, placed both under the Presidency of the Council of

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Patent and Trademark Office, responsible for policies in defense of industrial property, and the protection of consumatori. Insiem, Thus with the Ministry of Education and Research, therefore, public funding, the management of these funds, support to research and biotech industry, are reflected within the Italian territory, through the provision of investment from this ministry …. Through the implementation of specific measures in support of industrial R & D, the Ministry of Economic Development has played a leading role through the funding and low-interest loans granted to companies through the Revolving Fund for Technological Innovation (FIT) and the support for the promotion and development of innovative companies required by law 388/00 art. 106, paragraph 1. The Ministry has also launched in the Italian Network for Innovation and Technology Transfer to enterprises (RIDITT), launched in 2003, specific technology transfer initiatives aimed at industry and has promoted the uptake of biotech research through measures to facilitate the creation of firms in high-tech sectors, including through the funding of a dedicated incubator. The Ministry has also prepared, in collaboration with the Department for Innovation and Technologies of the Presidency of the Council of Ministers, the two 'Plans for Digital Innovation in Companies' (2003 and 2005), aimed at providing a comprehensive framework of interventions for technological innovation and the creation of new innovative companies, including in relation to biotechnology. The recent decree "Industria 2015" (2006) gives the rest a decisive role in innovation and production with a high innovative content to stimulate the economic growth of the country and identifies, albeit limited, in the life sciences one of the areas of technology -production with strong development impact. Within the Ministry of Economic Development by the Italian Patent and Trademark Office, which manages the regulatory system of industrial property. In particular, the Office is responsible for the receipt and monitoring of applications for grant of various industrial property rights and is responsible for the investigation and the possible award. The Office also provides an information service to the public. The actions of the Ministry in support of biotechnology are integrated analysis, which began in 2000 with the support of the Centre Chemist, on the state of Italian biotechnology. The analysis was updated in 2003, is of particular importance for the planning of development initiatives in the sector: the latest edition has proposed for this purpose a business mapping, research institutions and venture capital firms interested in investing in the field, highlighting the strengths and weaknesses of biotech companies. The Observatory Chemical has also promoted through the network of local observers, the growth of biotechnology through the identification of biotech entrepreneurs active in the north of the country, and interested in starting new initiatives in the South pole chemicals. pital interessate a investire nel settore, mettendo in evidenza i punti di forza e di debolezza delle imprese biotech.

[132] Together with the CNR, the main independent scientific institutions and centers of calculation taken into account in this analysis connected to the GMOs Italian structure of policy are: the National Agency for New technologies (Aeneas), the Italian Institute of Technology (IIT), the Central Institute for Scientific and Technological Research Applied to the Sea (ICRAM), the Council for Research and Experimentation in Agriculture (CRA), the National Institute of Health (ISS). With regard to these independent scientific institutions but in any case internal to the Italian Government, the National Research Council has had a strategic role in the genesis and development of biotechnological research in Italy, as long as it does not suffer the total shutdown of the policy and where, in any case, in the last years, thanks to the thrust of several scientists working in biotechnology enters this committee, alerting seem glimmers of recovery opening the biotechnological research, even in the continuous restrictions that characterize the Italian legislation. In any case, the CNR has a role of scientific advice and has assumed the role of coordinator of research agendas regarding biotechnology in the early stage of technological research in Italy, but from a regulatory point of view, both as regards the processes of risk assessment, authorization and control of the different phases, as mentioned before, the competent public authorities in Italy are: as regards the authorities and bodies responsible for notification, authorization and control, two offices responsible to the Ministry of health, two operational inter-ministerial commission for the examination of notifications. Beside these ad hoc committees set up, the National Institute of Health has a central role in all technical investigations.

Ministers. The first body 'shall be composed of representatives of relevant Ministries' [133], organizations and public and private institutions involved in various ways in the biotechnology sector and experts of various disciplines, such as microbiology, molecular biology, genetics, pharmacology and biotechnology. This institution has been developed in order to improve the interaction and coordination of the several issues which are related in the GMOs policy and with all the different biotech stakeholders. This committee has practical tasks and functions and it has been established in order to support bureaucratically the activities of the Italian government in the development of scientific guidelines of policy, considering social and public benefits and risk implied in different GMOs governmental decisions, and also all the social, environmental, economic and health risks connected to the development of biotechnology[134].

[133]In addition to a number of other scientific experts, the Centre has as members a number of representatives of the ministries, and other agencies and organizations, scientific, and economic Francesco Tuffarelli, Chief of the Department for European Affairs, Presidency of the Council Minister, Francesco Saverio Musolino, Judge of the Court of Appeal, Legal Advisor to the Minister for Regional Affairs, Tourism and Sport; Min Plen. Roberto Canton, Head of the Scientific and Technological Cooperation of the Directorate General for the Promotion of a National System, Ministry of Foreign Affairs; Paola Montagna, Technical Director Biologist, Scientific Police, Department of Public Security of the Ministry of Interior; Salvatore Vitello , Deputy Head of Cabinet, Ministry of Justice; Francesca Cappiello, Director of the General Directorate for Industrial Policy and Competitiveness, Division V, Promotion of Research and Innovation, Ministry of Economic Development, Joseph Blasi, Head of Department of European policies and international and Rural Development, Ministry of Agriculture, Food and Forestry; Luisa Pierantonelli, Directorate-General for Sustainable Development, Climate and Energy, Ministry of Environment, Environment, Land and Sea, Adriana Ciampa, Director of Directorate General for Inclusion and Social Policy, Ministry of Labour and Social Policy; Fabrizio Oleari, Head of the Department of Public Health and Innovation, Ministry of Health; Massuli Mauro, Director at the Directorate General for Development Co-ordination elo Research, Ministry of Education, University and Research; Carmela Marino, Head of Technical Unit Radiation Biology and Human Health, National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Leonardo Vingiani, Director of the National Association for the Development of Biotechnology (ASSOBIOTEC), Giuseppe Martini, Director of the Department of Life Sciences, National Research Council (CNR), Victoria Buratta, Managing Director for the development of information systems and integrated products, management of information assets and the assessment of the quality, National Institute of Statistics (ISTAT), Antonio Gaudioso, CNCU Director and Deputy Secretary Vicar of Cittadinanzattiva - National Council of Consumers and Users (CNCU) at the Ministry of Economic Development, Paul Grillo, Vice President Biotechnology, Farmindustria, Luke Gasparollo, Department Scientific Investigations of the Carabinieri (RIS), Rome. As can be seen from this list of representatives of those included within this committee, many of the actors involved in the commission, within the debate on GMOs in Italy, have proved inconsistent with the policy choices of the government, and have repeatedly expressed disapproval against political decisions without scientific foundation and avail themselves of financial institutions and independent bodies set up by the state in order to provide specialist advice in regulatory processes of the policy. In short, the opinion of many experts involved in the work of the committee, have characterized the basis on which it has developed the policy choice on GMOs of the Italian government, which in each case, as well as the UK, said to base its decisions based on scientific tears, but, while within the range of interests, actions and decisions of English that meant use of documents produced by the scientific subjects in order to support the tolerability of risk GMOs, for Italy the issue of GMOs has been based on a different assumption, the absence of sufficient scientific evidence to establish with some certainty the harmlessness of GMOs.

[134] Institutional functions of the Committee are mainly: the coordination of activities related to biotechnology, evaluation and control of risks from biological agents, advice on acts of national transposition of EU directives; processing of a cognitive framework of programs, initiatives and biotechnological activities in the country and the

Since 2003, as part of the Committee is operating the Centre for Biosafety, Biotechnology and Life Sciences, engaged in the construction of a mapping of structures and biotechnological activities and management of a database on biotechnology. The Centre was established to work closely with organizations active in the ministries, research institutions and regions[135]. The reasons, then, that support, in 2003, the institutionalization of the Observatory, are primarily directed to its function as a 'worker' public communication in the field of GMOs, in daily practice, responsible for the management of the same portal dedicated to initiatives within the Presidency of Ministers and the work of government related to biotechnology. If we consider, instead, the adversarial relationship between the largest Italian scientific community and the institutions of government, the scientific view of the actors involved and who have had an active role in the production of the debates and controversy over GMOs in Italy expands greatly.

Considering the singularity of the national Italian GMOs case study, in this reconstruction of the institutional structure particularly of the relationships between science and politics, and in order to highlight those more recent processes of scientific subjects' institutionalization, in the development of the Italian case study I particularly focused the attention on the constitution of a scientific extended group called Association Galileo[136], founded in 2003. In this scientific organism are converged most of the Italian scientific societies which decided constituting this collective subject

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evaluation of innovative biological technologies in various fields of research productivity and economic information and the dissemination of scientific and technical knowledge.

[135] In particular in this institution were assigned functions related to communication and dissemination of information and scientific communications, both within the organs of state with the public, and is responsible for monitoring the activities conducted in the field of biotechnology: acquired and put into circulation information and scientific knowledge, monitoring of its research and experimental biotechnology in order to formulate and finalize public investment (direct and being viable horizons, and private), promoting the development of scientific research and growth economic production and employment.

[136] The Association Galileo saw the light in 2001 February 19, 2003. "The aims and spirit of the association are contained in the statutes and in the Manifesto of the Movement itself. But, if you are prompted to summarize in one sentence, we can say that the association aims to provide scientific support to policy makers and the media in order to ensure that the laws and texts in physics, chemistry, biology, medicine and of science in general, is rewritten in the halls of parliaments before, and the courts, then. "http://www.galileo2001.it/rapid/; See the risks of an uninformed choice: say no to GMOs in agriculture, by Franco Battaglia and Angela Rosati, Galileo 2001 Association for the freedom and dignity of science, 2004...

particularly in order to support the liberalization of biotechnology research in Italy[137]. This Italian form of institutions and subjectivities making has been supported, within the Italian boundaries, by different scientists and representatives[138] of the Italian national scientific community and societies.

The emergence of this kind of scientific group of pressure, in the Italian GMOs controversy, shows how the seeds of 'discord' (and alliances) in this country is mostly related to the relationships between science and politics. As I underlined, the Italian institutions of government have developed a biotechnology policy of emergency, based on decisions that, in most cases, through governmental normative acts and decrees have imposed – and reaffirmed several times – a total ban, since 2000, to any kind of biotechnology researching and commercial activities connected to biotechnology field. Most of the public investments previously allocated in this area of research have been emergency blocked and public debates about GMOs in Italy arose, on the threshold of the new millennium, with increasing media coverage on this theme in those years, mainly through the conflict between scientific and political Italian authorities and subjects. With the expression of the zero tolerance to the GMOs in 2000 and with the block of any biotechnological research activities, considering this radical position of the Italian Government, the case of the GMOs controversy in

[137] in order to renew, after the ban in 2001 against political biotechnology research, the commitment of all the main Italian scientific societies in promoting the freedom of science and research in the context of product lines obscurantist policies of the government. National Academy of Sciences, the Academy of Lincei, the majority of Italian scientific societies took part in the fight against obscurantist policies of the Italian government in particular with regard to GMOs and have contributed to the production of such subjectivity of coordination, such as 'Association Galilei, the struggles of the scientific community against the political obscurantism, and, in particular, the production of two consensus Documents'137 claims that the consensus within the scientific society in Italian, all the main entities and academies of science on the acceptability of risks of GMOs. This arrangement of division between politics and science, in the Italian context, the identification and institutionalization of a series of scientific committee within the government apparatus, but before the declaration of Italian politicians unavailability continues to be open to biotech , particularly in agriculture, leads to consider differently the relationship between science and policy forms that are deployed in Italy and Great Britain, for the history and socio-political context that characterizes them, from the top level of conflict found between science and politics, in the Italian context, and the relationship of mutual consent between the various authorities and scientific societies and policies of the British government.

[138] Including: Franco Battaglia, Carlo Bernardini, Tullio Regge, Renato Angelo Ricci, Giorgio Salvini, Gian Tommaso Scarascia Mugnozza, Ugo Spezia, Umberto Tirelli. Among the members of the Organizing Committee are: Franco Bassani, Argeo Benco, Paolo Blasi, Edward Boncinelli, Nicola Cabibbo, Luciano Caglioti, Cinzia Caporale, John Carboni, Francesco Cognetti, Maurizio Cumo, Guido Fano, Gianni Fochi, Silvio Garattini, Silvio Monfardini, John Vittorio Pallottino, Panizon Franco, Ernesto Pedrocchi, Charles A. Pelanda Carlo Salvetti, Paul Sequi, Angelo Spena, Giancarlo Vecchio. Among these names, the Presidents of the most renowned Italian scientific and research institutes, ex-ministers for research and tall figures of scientists of international importance, include many of those who have played a crucial role in the controversy of GMOs in Italy, opposed the government's decision, thus expressing the lack of consensus between the policy and the information and directions from the consultative scientific topics. The most common criticism, in fact, that has been moved to the Italian government in decisions on GMOs.

Italy shows how through the diffusion of this kind of reflexive risk issues there is the possibility of the opening of spaces of social reflection, conflicts and resistances, in this case, among authoritative structures. The consequent opposition and dissent of a large numbers of Italian scientific societies reflects the position and reaction of most of the Italian scientists to the totally biotechnology ban of the Italian government. In this sense, I argue that the GMOs controversy in Italy for several aspects has begun and has been characterized through these conflicting relationships between science and politics. For some aspect, since 2000 the GMOs controversy in Italy has been translated, at least for what concerns the relationship between politics and science, in a conflict between governmental institutions and a large part of the Italian scientific community. Scientific subjects in Italy, in contraposition to the governmental authorities and politicians, have acted as political agents, demonstrating in public arena and in different forms of media communication, in order to make more scientific the Italian biotechnology policy and this through political instruments (of public participation to policy making). Science, in Italy, with the capital 'S' in those years, through the GMOs controversy, has expressed publically its mistrust regarding political and economic management of public founds destined to scientific research, in addition reporting the lack of scientific independent structures and strong political despotism, obscurantism and politicization of science.

Thus, particularly concerning the relationships between science and politics, in Italy the GMOs controversy can be mostly summarised through the events which compose the escalation of conflict between scientific subjects and governmental national authorities. Moreover, this means that through the GMOs disputes and in general from this kind of controversial risk policy are implicitly and explicitly implied a number of different and variegate issues which concern, as in the Italian context, with different critical and crucial aspects of the democratic life of contemporary states, as for instance issues related to the freedom of science and of scientific research within the current capitalist democracies of knowledge.

On a symbolic plan, the struggle opened by the political action of the Italian scientific subjects against the biotechnology national policy has been supported from different part within the Italian scientific panorama and by many accredited Italian scientists, like Rita Levi Montalcini, Renato Dulbecco, Umberto Veronesi – all against the decision of Italian government in 2000 to stop the biotechnological research. As I described in the Italian full version, these conflicts, in Italy, can be symbolized by several topical moments of conflict between science and politics: for example the so called "March on Rome" made by the Italian scientific lobby pro-GMOs, culminating in an event at the Chamber of Deputies, at Palazzo San Macuto (February 13, 2001), in which Italian scientists, other social and economic subjects pro-GMOs and, in general, 'lay' citizens expressed their public mistrust and disagreement in the governmental management of the GMOs policy as well as 'scientific' policies at large. These groups of Italian scientists have produced several publication, media communication and informative documents in order to make visible and manifest how the scientific Italian community, at large, and science in Italy, again, with the capital S, has in the years expressed a vision completely opposite to that displayed through the Italian decisions. The production of two consensus documents, signed by the most scientific institutions of national research and scientific societies, has been interpreted as a very symbolic manifestation of the need of scientific subject to be publically and politically recognized as a unique voice, removing completely, from public opinion and in front of politicians, the idea of scientific dissent and controversial aspect about GMOs risks.

As I already underlined the GMOs controversy in Italy has been interpreted, particularly from these scientific subjects, as a matter of freedom of research which resulted undermined, from the scientific point of view, by Italian political decisions which Italian scientists have considered completely irrational and not based on any scientific evidence. Rather, most of the Italian political parties[139] and the main governmental institutional Italian forces, since 2000, have reinforced their position of developing, particularly, the Italian agro-industrial sector as GM-free. These Italian

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intent and practices of claiming Italy as a GM-free nation have been legitimated, by governmental authorities, on the basis of the declaration of insufficient scientific evidences and thus affirming the impossibility to develop GM products for the high level of scientific uncertainty.

In addition, in this reconstruction of the recent institutionalization of the relationships between scientific and governmental institutions, in the development of the GMOs controversy, as for the British case, I considered the relationships between these institutional with the role of a series of national economic subjects, in particular relating to the different categories of farmers, food producers and distributors, this in order to identify how they interact within this institutional framework[140]. Considering, particularly, the structure and the main elements which I underlined in the national Italian case study, it is worth mentioning here the formation of Futuragra in the Italian panorama: this emerges as collective subject which has been constituted both as cultural association and as an economic union, by that group of biotech farmers, situated particularly in the Italian region of Friuli-Venezia Giulia.

I mention here the instituionalisation of this cultural and economic subject in order to underline both the dimension of conflict and alliance-adaptation among social actors through the affirmation of particular social structures modifications. In fact, on the one this collective subject within the GMOs Italian network is placed in opposition to the structures of the Italian central government. On the other hand, through the focus on the instititonalisation of this subject within the biotechnology Italian network it is possible to highlight some forms of alliance which emerge within the Italian national context: in fact, Futuragra's activities[141] is strictly connected and in collaboration with the several groups of pro-GMOs Italian scientists.

Finally, in the Italian context, as I argued in the development of the national case study, I found relevant to give an account of the role and position of the Catholic Church in the definition of the

[140] At this regard, I analyzed particularly the positions of: Coldiretti, Confagricoltura, CIA, and Coop….
[141] Futuragra, despite being considered and incorporated as a cultural association, in particular within the institutions and the institutional arenas provincial and regional Friuli, is also heard as the economic interest in the cultivation of GMOs, and in competition with speeches from other associations of agricultural producers and retail chains.

GMOs Italian policy[142]. Thus, the structures and national institutional networks presented so far has to be read in connection with the pro-GMOs position (especially in the development of GM agro-industrial sector) of the Church[143].

Trying to trace some first common elements which emerge through this comparison for differences between Italian and British national context, from the schematization of this institutional structures and processes of instititutionalisation, it is possible to consider how both in Italy and Britain the independency [144] from political and governmental commitments and relationships of scientific bodies is the characteristic which in general gives public legitimation, accreditation and credibility particularly to those scientific authorities and bodies which are constituted and institutionalized ad hoc in the development and diffusion of 'scientific' risk controversies of late modernity. In this analysis, the intent is not to 'measure' the national levels of independence[145] of scientific authorities

[142] Italian politics, the establishment of the first republic, was dominated by the Catholic component of the government, and even earlier by centuries-old struggle to oust, and then reappear and rule of the Catholic component in the dynamics of the formation of the Italian government. It is not possible here to include a summary of the relations between Church and State, in the formation of the Italian government and the constant interference of the Vatican state in the choices of Italian political power, nor how these relationships may have influenced and influence, in particular, the government's choices Italian on science, innovation and scientific research. However, the important factor, at least that has emerged from the speeches of the subjects, scientific, political, economic, whom I interviewed and with whom I came into contact in the research field, in Italy, is the fact that, unlike for many other policies 'scientific', one on all assisted conception, the Vatican said he was in favor of Italian agricultural policy and global open to GMOs. The main arguments, as described in the chapter on the Italian case, revolve around the issue of hunger in the world and the possibility that the application of this technology it is possible to positively intervene on the issue. Many of those I interviewed, scientists, farmers, politicians, referring to different subjects, from their perspective, are particularly involved in national debates on GMOs mentioned this position favorable to GM of the Catholic Church, apparently believing a certain centrality of the that 'even' the church schierasse in favor of scientists and biotech farmers, and promoted series of seminars and research within this field of science.

[143] ….Initially I had not considered this subjectivity as influential in the construction of public debate and controversy about GMOs, but a range of social actors, from the interviews I had with them, the public discourse that argued, have considered relevant the fact that the Catholic Church , unlike many other scientific controversies, had declared in favor of the cultivation of GMOs. This is another unique feature of the Italian context, in which, not only for speeches and public decisions regarding the spread of GMOs in agriculture and biotechnology research, often are raised within the social body, issues of non-secular nature of choices of the state, or in any case is signaled by a strong influence of the Catholic Church on the Italian government policy. ….

[144] …This is because the independence, autonomy, from social contingencies, politics, interests other than those of research, form the basic premise, through which the power dynamics of the current knowledge society: on the one hand, the scientific field is entitled, both internally and socially, as a neutral authority, and on the other, it is constituted as a basis of legitimacy of government policies, based on the scientific evidence produced since independence…

[145] In particular, scientific subjects and scientific evidence with which policy decisions are endorsed, as in this study, as outlined in the first part theoretical and in the course of research, the basic idea, on the relationship between science and politics in late modern society, it is, rather, the total contamination and confusion between these fields, involved in a constant process of hybridization between them. What can be detected by this analysis and how both the institutional scientific and political *interdependence* and reciprocity of the element is stressed as essential in order to make legitimate evaluations, analysis, scientific research that is to be recognized as foreign the dynamics of political power in which, however, institutions and scientific societies Italian, British and every where you are completely immersed.

from political power, rather the aim is to underline how, through the constitution of these para-state scientific institutions, there is increasing a processes of institutionalization of these (hybrid) spaces of scientific domain in policy and politics legally justified on the basis of the affirmation of states of emergency and crisis as paradigm of government of controversial public questions.

Schematisation of the dimensions and findings of comparison

In order to describe the dimensions of analysis and factors taken into consideration in this comparison on the processes of regulation of GMOs in Italy and Britain, below I have tried to summarize schematically the main issues on which I focus in this part. The elements of comparison selected as a guide does not cover all the issues explored in this work, but they represent a starting point in the end to summarize some of the dimensions analysed in this research. This is also in order to develop further aspects that may work as motivation for new studies, and that may be relevant to identify a set of generalization and characteristics, limits and implications, including different approaches to the study of power and knowledge.

The elements on which the comparison is structured are: *i)* the position of the institutions of government in Italy and Britain in deciding whether to take a positive or negative attitude to the spread of GMOs on their national territories; *ii)* the relationships between science and scientific authorities and subjects and national government authorities; *iii)* the relationships between the national GMOs policy of these two countries and the EU; *iv)* the relationship between governmental and scientific authorities and citizens; *v*) the relationships between the central and local governments in both countries.

Through these dimensions of analysis I aimed to detect both the common characteristics and those which differentiate the Italian and British context in the regulation of GMOs and biotechnology. In particular, through this case study, opening the analysis to a number of generalizations concerning risk and crisis policies, I tried to identify the (common) bases of justification of political actions which seem to derive from scientific argumentations, discourses and dispositives. Thus in this

comparison, this emerges as common data in both countries, as well as at the European level: the legitimation (of political power) is constructed on the basis of science. This produces, in different ways and levels, problems of democracy and social conflicts, but with different political results within the European knowledge society. The two cases study can be considered very different for many aspects, but here I intend to highlight a common point.

As I argued in the theoretical part, different political decisions and results in Britain and Italy are ultimately legitimated on the basis on science. And this is possible – legally justified – on the basis of the affirmation of a state of necessity and emergency which, in the GMOs case study, is realised through the centralisation of the policy and decision making on the (scientifised) issues of risk. Considering Agamben perspective in connection to the approach of risk society, this paradigm of government makes possible the development of certain kind of policy of 'undefinibility'. Italy produces a GMOs policy realised on the necessity of further scientific researches, blocking however national biotechnology research, and on the expression of emergency decrees which have been considered so far unconstitutional from the Italian Court of Justice and that are in contrast and in conflict with the European normative about GM products.

In Britain, the GMOs debate arose within a general context of food crisis particularly connected to a series of events of risk and diffusion of public mistrust, as in the case of the BSE crisis. This situation has determined a social environment in which 'risk' and 'public mistrust' have dominated public debate around GMOs. This has produced, on the one hand, the expression of a policy based on science, which has supported, so far, the development of the biotechnology enterprise in Britain; and the development of particular forms of institutional public engagement with science that are peculiar to the British context, and that seem to differentiate Britain from Italy.

In this sense, through the exploration of discursive justifications and legitimacy of decisional system in the GMOs policy, in particular, on the actions of government institutions, it is possible to focus on the wider processes of reproduction of power and authorities, in the relational dynamics

between science, politics and social bodies, and the mechanisms of maintenance of public order and adaptation of democratic structures and authorities to the factors of change and in the relationships with citizens.

Dimensions of comparison	***Italy***	***Britain***
I) *Decision making* – decision and position of central government in the GMOs regulation	Against GMOs	In favor of GMOs
II) *Policy making* – relationships between scientific and political actors	Conflicting	Alliance/Consensus
III) *National and European level of regulation* – relationships between state and European level of regulation	Conflicting	In line/Consensus
IV) Structures and Agents - Relationships between scientific and governmental authorities and citizens	Consensus	Conflicting
V) Central and local governmental structures - Relationships between central governmental structures and local entities	Consensus	Conflicting

Tab. 1. Dimensions of comparison and main differences in the field of the GMOs regulation in Italy and Britain.

I) Decision making: the Italian government has expressed, since 2000, a position of zero tolerance to the spread of GMOs on its national territory. Rather, the central government of Britain has maintained, in several decades of biotechnology development, a position in favour of this field of innovation and particularly of GMOs. This different dimension of decision making corresponds to the central and key element of divergent between Italy and Britain. As I argue in the synthesis of the common elements between the two national contexts, there is also a common dimension of decision making between Britain and Italy which consists in the partial, implicit, and sometimes more explicit use of the state of emergency in order to rule in the conflicts produced by the GMOs controversy in both the national cultures.

II) Policy making – through the relationships between science and politics: Within the Italian context of the GMOs regulation, the relationship between science and politics has been developed through deep and extended conflicts: these have dominantly characterised the Italian GMOs controversy, and in effect GMOs debates in Italy have been prevalently developed on these conflicts between scientific and political subjects. Differently in Britain, considering the historical singular relationship between scientific and governmental authorities, and considering also the diffused context of social crisis and public skepticism in 'scientific' policies, governmental structures and the main scientific societies of British countries have assumed a common positive position in regard to the biotechnology development as a national mission. In addition, within governmental structures of power, in the intersection between technoscientific bodies and governmental institutions there is a relationship of strong interdependency and reciprocal support in the affirmation of the paradigm of the GMOs issues as a science based policy (and this is arguable both in the Italian and British case, thus even in the Italian context which is characterized by conflicts between institutional scientific subjects and governmental forces).

III) National and European level of the GMOs regulation through the relationships between nation-states and the EU GMOs regulation: The Italian political decisions expressed in terms of prohibitions of GMOs and the general approach of zero tolerance, even toward those GM products already authorized at Community level, have generated a series of conflicts and disputes between the central Italian government and the EU, and within the Italian territory with the Italian constitutional Court of Justice. This is particularly evident considering the European policy after the 2004, when the EU authorised the commercialisation of some GM products and with the end of the EU moratorium on these products.

On the one hand, there are several disputes between European and Italian government still opens and they are all concentrated on the fact that the Italian government, even if it does not use the clause of safeguard in Europe, it is not allowing the cultivation and commercialization of those

GMOs which are already authorized within the EU system. This is opening, like for other national countries, disputes on the fact that the GMOs system of authorization is completely based on the scientific assessment and management of the biotechnology risk, while members states could be allow to forbid the GMOs cultivation and commercialization on the basis of economic, social, political and other 'extra'-scientific reasons, and this is at the core of the GMOs policy.

Rather, in Britain the gradual opening of the EU to GMOs has been established in accordance with the central government's policy which has supported a national and European policy in favour to the development of biotechnology products within European boundaries. Although there are some events and moments of conflict between the EU system and the British government, the British and European system of the GMOs regulation seems to converge for the main aspects of its structure. In this sense, I argue that the EU biotechnology policy structure is widely based on the British GMOs policy and more in general on its peculiar scientific governance of risk controversies. This is particularly visible both in the concentration of the biotechnology matter as a science-based policy and in the construction of this 'scientific' issue through the establishment of the necessity to develop jointed sub-policies of public engagement with science for the diffusion of public mistrust and skepticism. This structure is common to the European and British GMOs policy's structure, but it represents an element of contraposition and difference with the Italian context.

Nevertheless, as I schematise in the next table, both the Italian and British government of the GMOs policy has been founded on the European basis which emerge by the space of 'undefinibility' defined through the affirmation of the precautionary principle: this constitutes the common regime in which the GMOs policy is developed in Britain and Italy; and through the evolution of the application of this principle and its adaptation in different national and supranational arenas of risk policies it is possible to observe jointly a processes of normalization of risk through the scientification of policy, politics and public spaces.

IV) The relationships between authoritative structures and social agents – through the relationships between scientific and governmental authorities and citizens: The position of the Italian central government against, particularly, the development of the GMOs agro-industry has generated a peculiar (and tacit) consensual relationship between national political authorities and Italian public opinion. In fact, through the statistic instruments of European and national investigation about public attitude in Italy and Europe about biotechnology and GM cultivation, it is possible to observe how the Italian tendency is in line with the European attitude of social skepticism around Europe in regard to the spread of GMOs into the environment and in the food chains of production and distribution. This convergence between the Italian public opinion and the national governmental decision about GMOs has produced the effect of moderating the general social conflicts which emerge around Europe through the diffusion of the GMOs controversy, in any case producing other types of social frictions and conflicts. Nevertheless, this 'structural agreement' between Italian public and the governmental position does not imply the activation from the Italian government of forms of democratization of the GMOs policy, as I highlight in the next schematization of the common elements between Italy and Britain, this form of agreement can be considered tacit and in any case the Italian GMOs policy is developed by the governmental authorities through the idea of preordination of scientific reason of any other aspects and through the affirmation of an emergency policy which paralyses and alienates public and extra-scientific argumentations from the main spaces of public policy and decision making.

In Britain the situation is different from Italy for several aspects: the GMOs debate arose within a crisis of legitimacy of scientific and political authorities in the management of 'scientific' risk questions, considering the period of the BSE crisis; also, the central governmental authorities of Britain has developed a policy in support of the biotechnology enterprise, thus in contraposition with the general public attitude in relation to the GMOs issue. The relationships between citizens and public authorities in the GMOs controversy is developed within this general environment of public mistrust and necessity of power structures to regain public legitimacy. This characterizes the

GMOs controversy in Italy and in Britain in different way; in fact, in Britain both the scientific and governmental authorities have supporting and sustaining the development of those sub-areas of policies defined as public engagement with science. In Italy these experiments are not taken into account by government, I argue because in Italy there is not the urgency to chanalise public conflicts and resistances to the governmental decisions as in Britian (and not particularly because there is a more or less democratic process of policy making).

For several aspects, in public sphere scientific subjects in Italy acted explicitly in a political sense, although in conflict with the Italian government, trying to put in action strategies of public engagement with science: concerning specifically the relationships between scientific authorities and citizens, in Italy I observed a tendency of those scientific subjects particularly involved in the GMOs controversy to organise public and media manifestations in order to engage public opinion and in order to make, from their perspective, more ‘scientific’ public debates which are in Italy, for the biotechnology scientific supporters, ‘politicised’ by governmental acts and policy expressed through the zero tolerance to GMOs. In Britain, as I already mentioned, the main scientific societies and subjects, both those institutionalized within the structures of British governments, and those scientific institutions which are not involved in advisory activities, have demonstrated a favorable tendency in the development of this field of technoscientific research and innovation, most of these supporting the governmental position in support to this technology. In this sense, the position of scientific authorities in regards to those of public opinion about GMOs has been very often characterised for its role of distinguishing scientific evidences from public and lay subjective argumentations: this is visible in the idea shared by governmental and scientific British authorities of ‘educating’ public to technoscientific innovation, which is expresses particularly through the experiments of public understanding of science and, successively, public engagement with science peculiarly to the national British culture. This is a way through which to face public resistance in Britain, it represents the institutional reaction to public British mistrust in GM products, but it there

seems to be not a recognition of relevance or public legitimation of the meanings of citizens and about public concern.

In any case, this set of differences between Italy and Britain does not mean that in Italy there are not dimensions of conflicts between citizens and governmental institutions.

As I developed in the Italian full version of this work, in Italy the system of conflicts and alliances appears different than in Britain. For example, in the development of the Italian case study, I took into account particularly the case of legal conflicts between a group of farmers and particularly two GM farmers, in a particularly autonomous Italian region, Friuli Venezia Giulia, and specifically in Province of Pordenone (Vivaro 2010), who decided to cultivate GM maize, already authorizes by European scientific authorities, on their terrains. I considered this dispute as explicative of the ways in which the GMOs policy in Italy has been constructed on the basis of emergency and ad hoc normative act in order to block any attempt of GM diffusion. Furthermore, this case shows how in Italy on the basis of the different position of the government about the GMOs policy, different systems of alliance are activated: in fact, between this group of pro-biotech farmers and the Italian scientific pressure group in favour of GMOs there is a strict line of collaboration, exchanges and alliances in the Italian battle pro-GMOs.

On the other hand, in Britain, as I has deeper developed in the full Italian version, in the evolution of the national GM controversy I could observe the unfolding of particular relationships between ‘group of contacts’ between economic enterprise and NGOs which have developed public debate in a very peculiar way, and have characterised the GMOs policy construction and debate in a specific way: Uniliver and GreenAlliance, with their expertise, have pushed British governmental authorities to take into account public concern about GMOs. This development in Britain makes particularly visible the dimension of consumer-citizens and how in the GMOs policy processes of construction of citizens’ identities are involved.

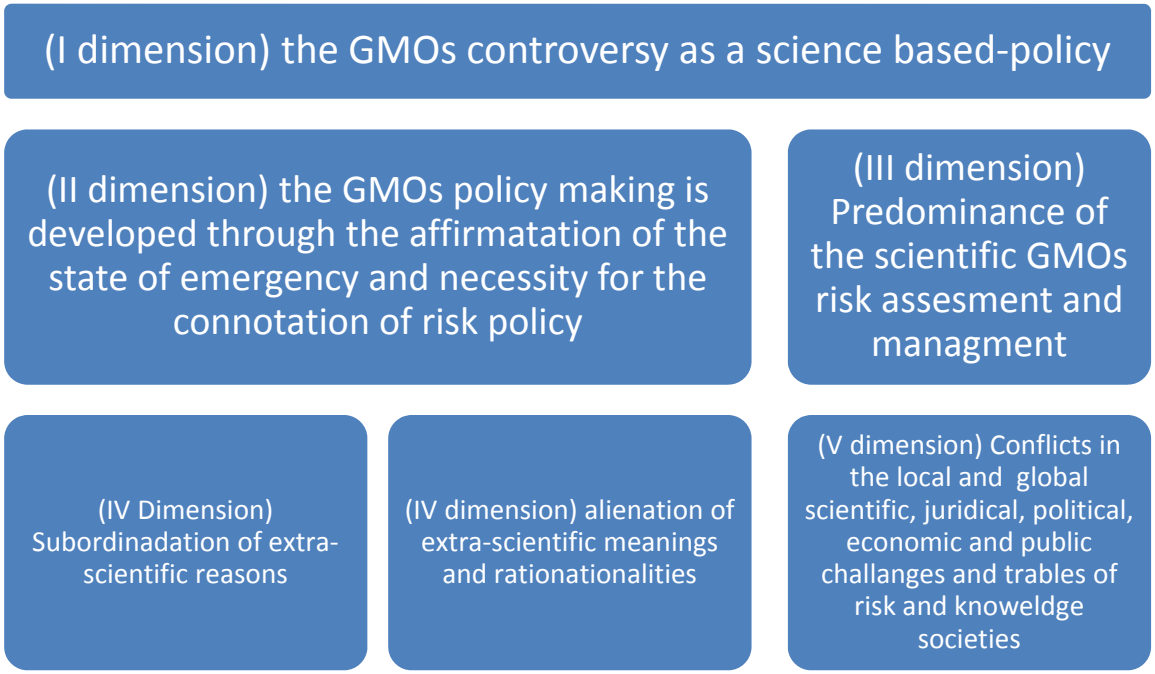
V) Central and local governmental structures *or relationships between central governmental structures and local entities:* as I mentioned above, through this dimension of analysis I intend to underline two differences tendency in the UK and Italy: in Britain the attitude of the central government is to centralise the decisional processes of the GMOs policy; rather in Italy, especially in the field of the agro-industrial development of GM cultivation, the Italian central government has developed a policy of decentralization of the planes of coexistence between different kinds of GM and non GM crops: since 2004 the competence is on Regions.

As I argued in the introduction of this comparison, these dimensions through which I schematized the main differences between the GMOs processes of public regulation in Italy and Britain, in the same way, can be used as guiding elements by which to identify common and shared characteristics and processes in the development of the GMOs controversy in both countries.

Dimensions of comparison	***Italy***	***Britain***
I) ***Decision making/dynamics of government's legitimation*** – decision and position of central government in the GMOs regulation	Based on scientific ground: on the basis of *not sufficient* scientific evidences	Based on scientific ground: definition and disposition of a science-based
II) ***Policy making*** – relationships between scientific and political actors	Policy and public debates reproduced through the affirmation of the scientific domain in politics: dispute between sound and weak science; representations of scientification and politicization of science/ invisibilisation of co-production processes	Policy and public debates reproduced through the affirmation of the scientific domain in politics: affirmation of the scientification of politics and policy; polarization of debate between sound and weak science; Invisibilisation of co-production processes
III) ***National and International level***– relationships between state and European level of regulation	Policy and public debated based on the predominance of the dimensions of technoscientific risk assessment and management/ scientism and scientific despotism	Policy and public debated based on the predominance of the dimensions of technoscientific risk assessment and management/ scientism and scientific despotism
IV) Structures and Agents - Relationships between scientific and governmental authorities and citizens	Alienation of extra-scientific reasons	Alienation of extra-scientific reasons
V) Structures and Agents -		

Relationships between central governmental structures and local entities	Conflicts	Conflicts

Tab. 2. Schematisation of the main common elements between the Italian and UK processes of the GMOs regulation.



In both these schematization I describe the common elements of comparison which I develop on the basis of the same dimensions which I used in order to synthesise the main differences between Italy and Britain.

The similarities which I observed through this comparative analysis are to be read, in particular, at the level of the main discursive dispositives through which both national debates have been constructed and political decisions legitimised. This means that most of the similarities identified through this comparison have to do with the general risk and emergency rhetoric of ‘scientific’ late modern policies and most of the GMOs issue controversial aspects, social crisis, conflicts and resistances are treated through the affirmation of dynamics of scientification of policy and politics which imply a subordination and/or alienation of extra-scientific elements in the main national

arenas of policy and decision making. Furthermore, in this part of the comparison for similarities between Italy and Britain I considered the discourses and arguments related to the various types of social actors (scientists, politicians, members of NGOs or industrial representatives) involved in institutional and public debate, and focusing on the discursive justifications through which these various actors have motivated their positions and chose a course of action rather than another. In both the national contexts it seems that most of the different social actors involved in the GMOs public debate and policy use scientific argumentations in order to justify their positions and give value to their party.

I) *Decision making/dynamics of government's legitimation*: both in Britain and Italy the decision and position of the central governments in the GMOs regulation have been legitimated and were stated to be undertaken exclusively or predominantly on the basis of scientific evidence. In the GMOs case study, I observed how in Italy the justification of the opposite position of the Italian government against the spread of GMOs has been constructed sustaining the issue of risk, and affirming that there are not sufficient scientific evidences which can let support a pro-GMOs policy. With different result, but through a similar mechanism, in Britain the political decision and position is claimed to be based completely on science. Nevertheless, differently than in Italy, this same regime of emergency based on science in Britain produces a positive biotechnology policy, in favour of the development of the different innovative sectors.

II) *Policy making – relationships between scientific and political actors*: the Italian case study in comparison with Britain, represents an explicative example of how the mechanism of scientification of policy and politics can work even in those circumstances in which scientific authorities and governmental power are in conflicts. In fact in Italy, where there is this contraposition between the position of scientific subjects and political forces on the GMOs issues, the decision in this policy is in any case legitimated essentially on scientific ground (non sufficient scientific evidences in order to support a national pro-GMOs choice). This dimension of policy making put in connection the

British and Italian cases: in both the European contexts there is the unfolding of an implicit, and sometimes explicit, state of emergency, which leads and reinforces the scientification of policy.

This is also visible within those institutional arenas of policy where the different stakeholders involved in the debate try to legitimate their positions preordering scientific reasons, meanings and aspects on the others, alienating in a way the full political, social and economic dimension of the controversies which are incorporated in the development of biotechnology. In the scientific domain of risk assessment and management, this predisposes in both countries the relationships between scientific and governmental authorities in a reciprocal reinforcement of the systems of social hierarchisation of knowledge societies. And this occurs even in those situations in which science and politics are in conflict, as in Italy. I argue that this is possible because at the basis of national policy making, historically and constitutively, as at the foundation of all the processes and dynamics of modernization, there are forms of scientism which, particularly in situation of emergency and risk, through the intricate relationships between scientific and governmental authorities can assume the features of scientific despotism. Within European boundaries both in Britain and Italy the developing of the GMOs debate focuses predominantly on risk issue. This setting takes form through dynamics of scientification of the order of discourse, practice and knowledge.

In this normative order, rather, political and economic reasons are themselves justified on the basis of models that can be granted on the basis of science, and this mechanism operates at the level of legitimacy of political positions through technoscientific arguments. The dominance of scientific discourse within the sphere of political decision represents an element of convergence in the relationship between science and politics in Italy and Britain, but it does not correspond neither in Britain and Italy to an effective ‘major’ power of scientific subjects on governmental forces. Rather here the attention is on the implicit, constitutional and invisible processes of reciprocal legitimation between the political and scientific authorities. This is visible in Italy as in Britain, and for both

countries this represents an element of proximity to the wider European framework of GM governance.

III) *National and International level* – relationships between state and European level of regulation: Within the European framework, and considering the history and evolution of the EU, Britain and Italy have assumed two different and singular trajectories of participation to the processes of European integration and to the predisposition of centralized system of policy and decision making. Historically, the UK has a euro-skeptical country, and rather Italy has sustained the European integration since the beginning of its recent history. Nevertheless, in the GMOs controversy this general attitude is not reflected, because British model appears as closer to the EU system of GMOs regulation than the Italian. In any case, the European focus on risk assessment and management, the translation of the GMOs issues in scientific matter, through the affirmation of states of emergency based on the same management of risk, are elements which put in connection these two different national systems of the GMOs regulation with the EU framework. In fact, beyond the singular national and supranational trajectories of policies, pro or against the spread of GMOs, the scientification of the GMOs policy operates from the European to the national and local level of regulation. This acts mainly: *a)* through the disposition of the regime of the precautionary principle to this kind of risk controversies, which pre-ordinate forms scientific domain; *b)* through the role of EFSA in the centralization of a European system of GM risk assessment; and also *c)* through the affirmation of the dispositive of the safeguard clause: all these European normative dispositives composing the GMOs policy structure are developed on the basis the preordination of technoscientific reasons on other kind of questions related to the GMOs controversy. This is the common European basis which connects Britain and Italy the development of singular and situated GM national debates and policies. Thus the foundation of forms of scientism and scientific despotism can be retraced both at European level and within European countries, with different features and characteristics.

Thus, through this comparison through the GMOs case study it is possible to underline how the implicit and explicit dimensions of this mechanism of scientification, the definition of biotechnology policy at as a risk issues and all these elements are common dispositives of normalization of controversial questions: it is as if the political character is partially obscured through the scientific disposition of the structure of policy and decision making. In other words: *a)* the translation of biotechnology policy in a process characterized by the emergence is a common dynamic in both national contexts; *b)* this connotation derives, firstly, from the international and European definition of biotechnology policy as scientific risk matter.

IV) Structures and Agents – Relationships between scientific and governmental authorities and citizens: the diffused public mistrust and skepticism toward GM products, especially in the agro-industry represents a common element between Italy and Britain in the relationships between citizens, science and policy. This means for several aspects that the relations with citizens particularly, in these emergency issues, are considered as problematic and critical from scientific and political authorities, while producing different institutional reactions and political decisions in Italy and Britain. In any case as common element, the paradigm expressed trough the governance of security is so constructed: public and social resistances are ultimately treated in turn as a form of risk for the maintenance of social order.

In the same way, 'public trust' represents an imperative and a constant motif in the rhetorical construction of the government of knowledge democracies: regaining public trust is what connects in general the GMOs controversy to the rhetoric of the policy of crisis and emergency of this phase of modernity. in this reproduction of the relationships between scientific and political authorities and citizens there is the implicit affirmation of a representation of citizen as in a more or less trustful relationship with scientific and governmental authorities. In this sense, public mistrust and consensus is placed at the centre of the liturgy of the scientific legitimation of power decisions, and

public participation, transversally in Italy and Britain, is reduced to a practice of making public consensus around already scientifically legitimated political decisions.

In this scheme, I argue that through the affirmation of the state of necessity and emergency as the paradigm of GMOs government, in general within the European framework, sustained through the scientification of policy and politics, produces forms of public subordination and alienation: public-political meanings are very often considered as in contradiction and in competition with those scientific and in a system in which these last are used as the basis for the construction of 'any' path of risk policies, the spaces and disposition of citizens' meanings about GMOs appears irreducible reduced, and public meanings are disposed as closer to the sphere of irrationality, creating a sort of antagonism between 'sacred' scientific meanings and profane citizens' position.

This happens particularly within institutional arenas of policy, but more in general all the GMOs public debates are predominantly management through these discursive dispositive which constitutes a common basis for the affirmation of different regime of scientific despotism in contemporary European democracies.

V) Structures and Agents – Relationships between central governmental structures and local entities: the explosion of different kinds of social conflicts, and alliances is particularly visible in both national countries if we consider the dimension of the relationships between the central and local government in the GMOs regulation. As I mentioned above, within the boundaries of Italian and British territories we have two different tendencies the Italian inclination to the decentralization of the GMOs management and competences to the Italian regions, and the attitude to centralization in Britain, which is supported through a series of national GM strategic plans and trying to affirm the idea of the UK as a GM nation, as if the GM choice can produced a form of national cohesion national. Rather around GMOs debate and policy in both national territories there is the diffusion of a series of social conflicts, and particular forms of alliances which put in common the Italian and British contexts of the GMOs regulation.

In Italy, the central government is engaged in a legal dispute with local GM farmers, situated in the autonomous region of Friuli Venezia Giulia. This controversy has produced common forms of conflicts, reactions and manifestations within the two national GMOs networks. On the Italian GM fields which have been planted by the group of GM farmers, there is the explosion both of a legal dispute with governmental subjects, and conflicts between these farmers and groups of activists which have expressed their radical position against GM fields destroying GM crops (August 2010). In this case there is the reproduction of different sphere of meaning of citizen and disobedient. GM farmers are considered by Italian governmental institutions as disobedient, but they claim to act in line with the European GMOs legislation. At the same time, the activists which acts destroying those GM fields are ambivalently considered both at national and local level as disobedient and subjects which operate 'restoring legality'.

Similarly in Britain, but with all the peculiarities expressed through the relationships between the central UK government and the national states, through the development of the GMOs policy there is the manifestation of several forms of social conflicts: as I underlined in the narration of the British case study, in the full Italian version of this research, the case of the GM experimental field in Wales (1998), as others in Scotland, is explicative of this conflicting dynamics between the central and local government. Wales has claimed its intention of expressing a GM free policy and this is in contraposition with the central national trajectory. Thus, when a farmer has decided to plant, as national experiment, GM crops at the confine with Welsh territories, local administration, citizens and activists have expressed their resistance. As in the Italian case, activists destroyed the GM field, and the Welsh Court of Justice claimed innocent the activists, and disobedient to the rule of Wales the GM farmer. As I argued in the theoretical framework of this study, summarizing Jasanoff's perspective, in both the national contexts, in these dispositives of the ordering of society through the ordering of 'scientific' policies, I see the reproduction of levels of citizens' identities which are involved in the conflicting dynamics and social changes that risk controversies as GMOs reproduce in different local contexts. These can be considered as common forms of social conflict

and resistance, and as the expression of radical reflexivity and social reflection in regard to the model of development and progress of contemporary democracies.

Conclusion

Science and 'scientific' controversies imply and are reproduced through institutional adaptations, power relationships, structural reforms and social changes. Considering how it intrinsically involves a stronger or a weaker dimension of risk and uncertainty, scientific regulations and the scientific ordering of knowledge societies appears as the main institutional instrument in order to face the conflicting dynamics of social change.

The emergency and necessity of reforms, within the international, European and national structures of power, seem to be the general common response to the current crisis of legitimacy of public scientific and governmental authorities. In many cases, these reforms are interpreted as possible essentially on the basis of the reinforcement of the technoscientific domain in politics and policy, through, for example, the affirmation of technical government as in Italy and in Greece in the last years. The idea and position of overcoming current crises predominantly through technoscientific instruments seems to re-affirm, rather, the general scientistic and linear logic of science in politics, taking for granted the centrality and domination of scientific meanings on the *others*.

In this state of things, I argue that in contemporary democracies, concerning the GMOs risk management, we can speak about the formation of a policy without politics, while political and social conflicts and acts of public resistance explode in all Europe: in fact, this is in the sense that the field of policy is dominated through the science-based definition, and the different political issues which emerge together with and through the development of the GMOs controversy seems to be obscured, and in any case kept apart and isolated from the scientifised field of the biotechnology regulation. Processes of reflexivity are in this sense obscured, and under the governance of emergency and necessity, based on the scientific assessment and management of policy, the co-produced dynamics of hybridization between science, politics and citizens are also made invisible through the idea of science as the predominance form of knowledge able to lead human development. Through the following words, published in the November 2012 Nature Editorial, it is possible to read that particular scientistic vision, which I tried to underline in this comparative

research, about science in politics and policy, regarding particularly the relationships between technoscience, politics and citizens in contemporary knowledge societies, and specifically in Italy. It should represent the perspective of the international scientific community, in a way, or, in any case, it seems to speak in the name of science, with the capital s.

> Science is subject to a level of irrational suspicion in many countries, but in Italy there is a perception that science doesn't even matter — a state of affairs encouraged by decades of underfunding and political *disdain*. Italy invests just 1.26% of its gross domestic product in research and development (R&D), compared with Germany's 2.82% and a European Union (EU) average of 2%. In 2009, Italy employed only 226,000 full-time-equivalent R&D staff, whereas Germany had 535,000. The system has long suffered from the lack of a legally enforced meritocracy, allowing cronyism to taint academic appointment and promotion. Heads of research agencies have often been political appointees rather than competent experts. Successive governments, well aware of the problems, introduced a series of reforms that tinkered with the system without fixing it, causing only further uncertainty. Then, three years ago, came a watershed: the reform-to-end-all-reforms intended to give more autonomy to research agencies, along with appropriate accountability. It sought to introduce an independent system to identify suitably qualified candidates as agency presidents (see http://doi.org/fwskwv), as well as a national research-evaluation agency whose assessments would be linked to funding. (Nature's Editorial, November 2012)

"Disdain" recalls the idea of sacred sphere – science – which, on the one hand, is subject to a process of 'secolarisation' among 'profane' citizens, for the diffuse public sense of mistrust and suspicious toward scientific and governmental authorities. On the other hand, in this way to put the relationships between science and public, juridical, political and public resistances and conflicts concerning the scientific, political, economic and social management of public science's controversies are translated into irrational suspicion and disrespectful attitude toward science.

Furthermore, the problems in the relationships between scientific and political authorities and subjects which are underlined in this article summarise the different element of public contrast between science and politics in Italy: troubles for the low level of public investment in Research and Development in Italy; concern for the obscurantist vision of Italian politics and public, disengaged with science and which do not matter about science; the necessity of reforms, particularly in the sense to increase the level of autonomy and independency of scientific authorities in the reproduction of social orders. In this sense, and considering all the other problems underlined

through this vision, this document can represent a significant summary both of the differences and similarities which I found between the Italian and British system of regulation in this comparison.

> Designed by the centre-left government of Romano Prodi, it was finally passed into law in 2009 by the centre-right government of Silvio Berlusconi. Enactment of such major reform has been a struggle, particularly for the newly appointed presidents of the 12 research agencies — which include the National Research Council, the National Institute of Nuclear Physics and the National Institute of Astrophysics — who are currently finalizing their new statutes. But a spirit of confidence has emerged. The agency presidents have formed a loose, cooperative alliance. And even the historically *timid* national academy, Accademia Nazionale dei Lincei, has become outspoken — for example, loudly challenging the L'Aquila court decision. But research minister Francesco Profumo seems set on tipping things off balance again. In a *murky manoeuvre*, he announced reform plans in a financial newspaper on 11 October that would, along with other major changes, merge all 12 agencies into a single national organization — before the end of the year. He argued, unconvincingly and without a technical plan, that such a system would help to save money and win EU research grants. In the style of the old guard, whose day was thought to be done, he did not consult the general scientific community on the matter, not even agency presidents. It is impossible to imagine such a thing happening in, say, Germany, a country whose successful scientific system Profumo says he would like to emulate. German politicians and their administrations are in appropriate awe of their research-agency presidents and of the scientific culture they represent. It is also hard to imagine courts there crudely running rough-shod over science. (Nature's Editorial, November 2012)

The reforms which are called as necessary in the Italian contexts seems to be related to the predisposition of a series of instruments able to make more rationalized and scientifised both the governmental structures of power and scientific bodies, restoring and affirming a stronger system of scientific advisory in policy and decision making, and developing the role of scientific societies within reforms' dynamics. Autonomy and independency of science within and outside the structure of governmental and juridical power is what reforms have to predispose, from this perspective: scientific reforms as special, exceptional field of social change and ordering. In these words there is also the definition of the Italian national scientific academy, Accademia Nazionale dei Lincei, as a timid subject within the structures of power. As I tried to show through the comparative analysis, in this definition can be read one of the structural elements of major divergence between Britain and Italy: in fact, Royal Society cannot be defined as a timid subject within the definition of the prevalent and more relevant meanings and subjects of 'scientific' policies. Nevertheless, as it is suggested in the article, in the current governmental Italian reformation there is the attempt to re-

build national culture and political, juridical and social structures through the affirmation of a deeper and reciprocal relationship of legitimation between state structures and science.

> Profumo's amateurish proposal, which he tried to insert into Prime Minister Mario Monti's crisis-related financial law for 2013–15, did not survive first-round parliamentary scrutiny, but Profumo seems set to try to push for some sort of high-speed change — his government is slated to dissolve in March. *Crucial for now is that scientific leaders are left in peace to complete the reform-to-end-all-reforms, and that science doesn't fall victim, once again, to opaque politics. Building respect for science takes time*. (Nature's Editorial, November 2012)

The ideology and discursive bases of the paradigm of government represented in the form of scientific despotism is expressed in this vision for which it is necessary to leave in peace scientific leaders in order to leave them to complete the reforms. Ambivalently, scientific subjects are identifies as political-managerial actors and leaders of public reforms, although scientific authority is claimed to be based on the autonomy and independency of scientific field to social, political and economic contingents. Public disappeared under the preoccupation for science and under the idea of risk and emergency of obscurantist and irrational forces which can make science as a victim. The reasons of science are taken for granted as the reason of states, thus public and political resistance and opposition can compose a risk for the affirmation of a system in which the general end is the construction of social order which respects science.

Where are citizens in this disposition of power? It seems that through this discourse, considering its focus on the affirmation of a reciprocal adaptation between governmental and juridical structures of power and scientific authorities, the dimension of public participation to policy and decision making of these public reforms is completely alienated.

On the basis of these considerations and connecting this rhetorical example of scientific despotism to this GMOs comparative analysis, in this dissertation I developed the case of agricultural biotechnology in Italy and the UK, exploring the relationships between science and politics within public sphere, and focusing particularly on those forms of coproduction of normative knowledge which rule in the GMOs regulation within the wider European framework and in these two

European national contexts. In this scope, I analysed the constitutive relationships which connect politics, science and citizens in the current (technoscientific) risk governance of knowledge societies, trying to look, on the one hand, at the consequences on the democratic systems of the affirmation (but through an obscuration) of those regimes of power which emerge from the deep hybridization between the structures and ordering of scientific knowledge and politico-juridical authorities. On the other hand, I focused on the implications of these regimes of governance on the dynamics of public participation to the decision and policy making in biotechnology field, and more generally in risk controversies.

In the part dedicated to the comparison between Italy and Britain I have schematically shown the main dimensions of this confrontation and how they have been explored: mainly, using these as research paths, I intended to identify some crucial and situated differences and singularities regarding the democratic structures of the relationships between science, politics and citizens in the two national contexts; and, at the same time, I focused the attention on those analogies that emerge looking simultaneously at the international and national diffusion of the regimes of power of knowledge societies through an analysis of the governance of risks, crises and decline in Western civilization. As I argued in the previous sections, through the GMOs case study, the main dimensions on which I elaborated this exploration are: *a)* the position of the Italian and British central government relating to the development of GMOs on the national territories; *b)* the relational forms between science and politics; *c)* the relationships between scientific and governmental authorities and citizens; *d*) and that between the central governments of UK and Italy with the European level of the GMOs regulation; *e)* the interactions between the central governments and the local entities in these two different state structures.

I elaborated and used these dimensions with the aim to keep together the relationships between science, politics and citizens in several transversal aspects of the GMOs controversy, which reflect

the different levels and scopes of the relationships between authoritative structures and social agents in current knowledge societies; and in order to underline how:

in situated and singular national and local cultures the co-production and development of the governance of biotechnology, while using a certain order of discourse and action, and affirming some forms of normative knowledge, can produce opposite political results, in terms of public decisions and national positions, especially in those fields of policies that are related to particular controversial dynamics of technoscientific innovation and social change. This is explicable on the basis of the affirmation of a form of supranational governance of risks and crises that is, discursively and in facts, founded on the formation of states of emergency and necessity as paradigms of government of these controversial political decisions. Albeit with opposite political results and decisions, the affirmation of the state of emergency as paradigm of government of the risk and crisis policies in knowledge societies is supported by the establishment or/and reinforcement of forms of scientific domain in policies. This corresponds to the prevailing of a scientistic ideology in politics and to the development of dynamics of scientification of policies, with the consequences of, on the one hand, obscuring the dynamics of coproduction of normative knowledge through which, rather, the decisions and trajectories of policy are taken; and, on the other hand, alienating any extra-scientific factor from the main domain and arenas of decision-making. In this study I interpreted these processes of obscuration of the hybrid 'invisible' power which reign in the governance of current risk societies, and these dynamics of alienation of extra-scientific factors, from the space of suspension of the rule of law (imposed through the affirmation of the state of emergency and necessity), as forms of scientific despotism in the management of the crisis of modernity. I conclude that these forms of despotism are generated and reproduced on an international level – or on a glocal dimension – and they find a specific and situated affirmation and development in the different national and local contexts. Through the explosion of the (economic, political, environmental and social) crises, risks and controversies in contemporary capitalist democracies, the social consequences and political results of the international governance of risk

can produce several levels of despotism, and different reactions, contradictions and social conflicts and resistance in the development of important field of innovation.

In this regard, my conclusion is that there is a relationship between the level of despotism and the different forms of resistance which emerge between public and scientific and governmental authorities within international, local and national contexts. The model of scientific despotism as paradigm of government of the risk controversies is the idea which stronger emerges through this research. The scientific despotism is an invisible relationship of power through which the neutrality of the scientific authority should correspond to the principle which legitimates public and political decision.

Considering the dimensions analysed in this comparison, I tried to understand the reasons for which the Italian state government has developed a policy, in Europe, based on its refusal to GMOs, and why, rather, the central British government is expressing a position in favour of the biotechnology enterprise, promoting the research and development in this field of innovation and its interest to construct a higher level of public consensus and agreement on this controversial issue. Starting the comparison with this question, I explored how these opposite paths of policy have been developed, through which relationships between science, politics and citizens, and within which kind of structural and historical conjunctures and differences among national political cultures.

As signs of discontinuity and singularity of the two national case studies I found: the social crisis of the BSE in Britain and its public consequences on the system of beliefs which connects politics, science and citizens in this capitalist European democracy; the different regime of food and feed between Italy and UK, and the diverse structure of agro-industrial sector (where in Italy the production of food prevails on the logic of the distributions and commercialization, differently than in Britain, where the agro-industrial sector seems to be dominated by the big companies of the large-scale distribution); the singularities of the relationships between scientific societies, institutions and subjects and political and governmental power in these two countries, the divergent

need to involve the public in the GMOs national debate; the opposite forms of social conflicts which have emerged between Italy and Britain in the biotech dispute; and particularly the dynamics of decentralization (to the Region of the competence to predispose the implementation) of the GMOs policy in Italy; and the attempt of centralizing the decision on the GMOs field of innovation in UK, within the relationships between local entities and the government of the central states. Furthermore, concerning the interactions between the government of the central states of Britain and Italy and the European level of the GMOs regulation, in this study it is emerged how the Italian position, trajectories and practice of policy has been completely in conflict with the EU approach, while the structure of the GMOs policy in Britain has been very similar to the development of this field of scientific governance in Europe.

These plane of differences can be summarized The three levels of observations of this dissertation have been focused on the institutional relationships between the central government with the European and international framework of regulation; the relationships between the (political and scientific) institutional subjects and citizens in the two national contexts; and the relationships between, mainly, the scientific and juridico-political institutions within the Italian and British structures of power.

In order to explore these directions of analysis through a situated perspective I extended the observation to the differences (and analogies) which emerge by the comparison of the local dynamics of social, political, economic and juridical conflicts that arose in the GMOs controversy in the negotiation of the power and competences to decide about this issue. Through the exploration of this dimension of analysis which is focused on the relationships between the central state and the local entities and citizens which live in their own local territories composing the national states of Britain and Italy, I can conclude that in these two countries there are two difference tendencies that seem nevertheless to be sustained through the same mechanisms of power, the same general rhetoric and discourses. These two tendencies can be expressed as a driving decentralization of

competencies and constitutional powers to the regions and local entities, particularly in the formulation of the action and co-existence plans between GM and conventional plantations in Italy, and a policy of centralization of the UK which has developed its own biotechnology policy supporting the idea of Britain as a 'GM nation', in the conflicts particularly between Wales and Scotland and the central British government. In fact, in Britain especially these two national entities have expressed a position against the development of biotech agro-industry on their territories; this is in contrast with the general line pro-GMOs of the British central government and it is a reason of conflicts and a path of exploration of those dynamics of power and the ways in which the normative knowledge coming from the general structure of the discourses and practices of the GMOs regulation.

In addition, in both national contexts several social and legal conflicts arose between institutions, groups and subjects placed at the local level (regional and state respectively in Italy and Britain) and the central governments of these nations. The dynamics of conflict are different and for several aspects are opposite; but the structure of the discourses, the regime of the political decisions, the dominance of the scientific factors in legitimating public assertion : in Italy, particularly in the geographical area of Friuli Venezia Giulia, the dispute between the state and local structure (agricultural, political, economic) unfolds through the position of a farmer, supported by the entire Italian network in favor of biotechnology, against the Italian state which condemned this cittadinio for planting gM maize although in contrast to the Italian law that prohibits the cultivation gm.

Moreover, the aspects which I particularly considered of the biotechnology controversy is connected to the complexity and the character of hybrid dispute of the GMOs case study: in fact, especially concerning the development of the biotech in agro-industry and the issue about the spread of the GM products and food, this dispute cannot be understood without an exploration of the international dimension of policy and public debate; at the same time the GMOs controversy has been developed in different ways within the several states, and in this sense it requires a particular

attention on – both in policy-making, and in theoretical and public debates – the national and local dynamics of environmental, economic, political and social development. Furthermore, this case study has represented a window through which to look at the intricate relationships between the reproduction of the scientific authorities, and their systems of beliefs and truths, and the structuring of juridico-political power, in current capitalist democracies.

The interpretative model of the current management and governance of risk in the crisis of capitalist democracies which I proposed in this dissertation has been aimed to emphasize the idea of invisibilisation of these processes of hybridization and obscuration of those forms of power which emerge by the intersections between economic, political, scientific and social factors. Deliberatively or not, in the development of the GMOs controversy through the process of legitimation of policies and decisions predominantly on the basis of scientific grounds, there is a first level of invisibilisation of both the intricate relationships between scientific, political, economic commitment and interests, which are in any case strictly involved in the reproduction of the biotech enterprise; and there is also the negation of the fact that this field of technoscientific knowledge – as any other form of knowledge production – is socially constructed, and it is constituted through the conjunctions between economic, scientific and social interests which, in one or in the other direction, contribute to create and reinforce the biotechnological network.

Following this perspective, the scientification of policy, ultimately, occurs through the translation of political, economic and social issues, relating the development and progress of current democracies, into terms of technoscientific assessment and management of the risks that these processes of innovation and social change can involve. From the discourses, actions and interaction and decisions which I studied through the GMOs case study, the processes of purification of science which are interpreted by Latour, as opposed to his idea of hybridization, seem to be reproduced in public sphere as well as in a laboratory. It is a question of dogmatic and normative role and dynamics intrinsically internal to the field of science in the construction of its sphere of authority.

Furthermore, considering the crucial role of science in public decision-making and in the current management of risk and crises, the obscuration of this normative character, and the social dimension of science which is composed particularly through this normative characterization is developed through dynamics of purification of science through the affirmation of the neutrality, autonomy and independence of scientific actors from economic, political and social aspects.

Considering the network of relationships of the GMOs controversy in Europe, the process of purification of science from its societal nature seems to be functional in reinforcing the modern structures of power and authorities, particularly in the constitute relationships between technoscientific subjects and means and political and economic power. It is has if these deep relationships at some point of the processes of decision making, in Europe and in national context, are neglected and it is sustained, rather, an ideology of full externality and neutrality of scientific authorities through which the current situations of crises have been governed.

In this sense, in the obscuration of the co-production processes of normative knowledge which rather rule in these policies that are treated as emergency and necessity, the scientification of policy works as basis of legitimation for controversial political decisions which imply more or less high levels of public mistrust, concerns and skepticism and in those situations which are considered as possible sources of risks and emergencies. Furthermore, I concluded through this research that speaking about the dynamics of scientification of policy is a way to represent what I consider the very critical aspect of the current system of European governance of crises: through the idea of neutrality of science in politics 'every' kind of public resistance can be seen as irrational and any kind of decision can be legitimated. On the basis of emergency and necessity, as it is expressed at the European level, considering the GMOs case, normal procedures can be perceived as an obstacle to the development of scientific (and by association human) progress: "*…we've created a state-of-theart machinery for handling GMOs, we're really struggling to use it as well as we could be … vital time is being lost in procedures… The result is that a growing number of GM products are*

widely used in other parts of the world, but are not yet authorised in the European Union". (Mariann Fischer Boel EU Commissioner for Agriculture and Rural Development Speech, 15 October 2009)

In this sense, It is: "*…necessary to look for improvement of the implementation of this legal framework in order to better meet the objectives of the EC legislation, taking into consideration the necessity of continuing processing applications without undue delays…" (*2012th Environment Council Conclusions *Unanimously agreed on 4 December 2008)*

Thus, I argued in this comparison the state of emergency is partly based on the expression, at the international and European level, as well as in national and local contexts, of the urgency of scientific assessment and science-based policy. This dispositive of power is supported through the affirmation of a series of polarization and dichotomies between subjects who sustain science and social forces which are opposed to the technoscientific development. This is part of the strategy of the emergency, which translate public resistance and opposition in the risk of irrationality and disorder.

> The strategy included creating a polarization between the progress of science, on the one hand, and a presumed threat to such progress coming from the NGO camp, whose vision was purely 'ideological', i.e. not based on scientific facts (Oda, 2004). In that light, a positive outlook on science is painted as a norm, a natural law to be respected and never questioned. It is indeed true that, as a rule, biotechnology companies and part of the scientific community use a 19th-century positivist mindset to legitimize their actions and declarations. If the product of science is positive, why not release it? As a consequence, a second norm (that of liberalism) arises to guarantee a regulatory framework that is as quiescent as possible, so as to accelerate the approval process for applications for the commercial use of GMOs and products thereof (Pelaez, 2004). Those norms, however, are also ideological, as they express one specific social outlook on the world, which is often incorporated by scientists. As Foucault (2000) observed, the power of democratic regimes lays not so much in laws as in norms, not in that which legalizes (since laws are not even respected by the authorities) but in that which legitimizes, in that which convinces others that it is the only way to go. The efficiency of the devices of power depends on the efficiency of control over knowledge, especially scientific knowledge that is presumed to be rooted in universal values of objectiveness and neutrality. (…) The risk of not consolidating that web exists when the state's own strategies become sources of instability, since rules are constantly altered to satisfy specific sets of interests. As Agamben (2005) has put it: Security as a paradigm of government is not born to bring order, but to govern disorder. (…) The drive to stabilize that regulatory body is sustained by a discourse dating back to

> positivist science, which seeks to minimize both the importance of the technology's risks flaunted by NGOs and the participation of the public at large as active players in what is considered a matter for experts. From this outlook, the centralization into the hands of a small group of experts of decision-making powers over risk-analysis criteria and procedures would reduce the uncertainties inherent in the diversity of interpretations over which biosafety guidelines ought to prevail. Appeals to order, to which authorities constantly revert in their quest for the legitimacy conveyed by positive scientific knowledge, contradict their own political practice in producing the legislation intended to prescribe that very order. Far from being a coherent text or the fruit of a technically grounded plan arising from clear consensus-building mechanisms, the new biosafety law is simply the outcome of a patchwork settlement amongst diverging interests, unable even to remain within the bounds of its own original purpose, as a law on the biosafety of GMOs. The dissatisfaction expressed by a variety of interest groups over this new version of the biosafety law reveals the continuity of a state of exception whose perpetuation as a technique of government is not legitimized by the maintenance of order, but by the re-creation of disorder. (Pelaez 2009:61-71)

In the re-creation of disorder, the idea of legitimating political decisions, governments, and processes of governance on citizens predominantly on the basis of scientific assessment and management produces forms of scientific despotism which: *a*) obscure the social, economic and political interactions which, rather, compose the political decisions and the path of development of technoscientific knowledge; *b*) alienate public and 'lay' positions, subordinating extra-scientific rationality to that scientific.

Nevertheless, the neutrality and the character of externality which is conferred to the scientific authorities in the GMOs controversy is constantly challenged by the general contest of risk and public mistrust toward GM products. The co-production of hybrid forms of governance are, rather, affirmed as model of 'scientifised' policies in order to face the situations of necessity and emergency which are 'always' implied in current risk controversies and crises of late modernity. In the dynamics of scientification of policy and politics through the paradigm of the state of emergency and necessity in the management of the crises of risk society I concluded that:

a) there is an invisibilisation of the processes of co-production of normative knowledge and an obscuration of the hybridization between the economic, political, scientific and social f-actors which are involved in the GMOs issue;

b) this scientification-invisibilisation of extra-scientific factors which compose the sphere of decision-making of the GMOs policy works affirming and/or reinforcing the super-ordination of scientific standardizations, assessments and arguments in order to face the crises of the system through the same model which is placed in crisis. This means that: *i)* in the governance of risk extra-scientific reasons, rationality and concerns are considered subordinated and very often irrelevant and also as source of risk in its-self for the maintenance of public order and in terms of public decision-making; *ii*) there is a dynamics of alienation of public and citizens' meanings in the necessity to predispose scientifically the field of policy; *iii*) scientific and political/public meanings are very often represented in conflicts, but associating this conflicting situation to a lack of public knowledge about science and for the fact that scientists and public make sense of risk, uncertainty and controversial questions in a different ways. (Burke, *Interview*, March 2011)

Through this interpretation co-production processes are more or less neglected and obscured.

Finally, this dissertation has sought to propose a situated and reflexive way to look at the relation between citizens, science and politics in current democracies, but at the same time trying to make some generalizations in relation to the ways in which power is currently expressed in knowledge capitalist democracies. The perspective proposed in this work aimed to emphasize the complexity and multidimensionality of these relationships and the hybridization between science, politics, law, economy and society in the co-production of biotechnological products and imaginaries. Focusing on the dynamics of co-production of normative knowledge which rules in the regulation of risk issues, I considered the particular attention in STS debate of those interpretative approaches which aim to underline the idea of impossibility of treating questions linked to power apart from the study of (technoscientific) knowledge. I tried to considered reflexively the development, in STS, of necessity to construct the idiom of the coproduction of normative knowledge as in interpretative model capable to highlight the intersections between politics, science, law and civic cultures in the reproduction of social order through the ordering of technoscientific knowledge within dynamics of

social change, innovation and, at the same time, stabilization of the system of power. This means that, underling this attention and this attempt in STS debate of showing these interconnected relationships which co-produce the forms of power that rule, especially, from the perspective of this research, in risk issues and controversies, I aimed to consider the fact that this 'need', in social science, to give expression to the complexity of processes of co-production of normative knowledge is in turn the expression of a dynamics of invisibilisation of these same processes both in the intellectual and public debates.

In this sense, and trying also to summarise and underline the main limits of this research and those points which might deserve a more extensive analysis, connecting the approach of the co-production to the idea of affirmation of the state of emergency as the paradigm of government of risk issues, it may result essential to explain how from a dynamics of co-production of social order, shared between scientific, political, juridical, economic and social actors, structures, meanings and discourses, it is possible to speak about forms of scientific despotism justified on the basis of scientific assessment and management of risks and crises.

Ultimately, it is particularly when public and political meanings are in conflicts with scientific representations of human progress that scientific despotism appears as more visible, as in the case of the GMOs controversy; nevertheless scientism seems to configure currently the common basis of the paradigm of government of emergency and risk.

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