



## From precautionary inadequacy to participatory risk management

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### ABSTRACT

This paper examines the case of mobile telephone infrastructure as an example of a contemporary risk defined by a lack of scientific evidence and consensus as regards potential or future harm. This uncertainty has led to recourse to the precautionary principle at the European, national, regional and local level of EMF risk management. Local risk governance of mobile telephone infrastructures in Catalonia can be seen as an example of a socio-technical complex system linked to risk perception which highlights the limitations of the precautionary principle in a scientifically uncertain context. Active participation of stakeholders and the public in risk management arenas is required if current technocratic risk management strategies are to be superseded by transparent processes of decision-making in risk management spheres.

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### 1. Introduction

Contemporary society is currently faced by an increasing volume of issues related to the complexity of scientific and technological progress. Risks associated with different socio-technical complex systems are comprised of technical elements and social processes of definition between distinct social actors [1–4]. The high potential for complex interactions [5] and the highly uncertain scientific environment in which these socio-technical systems operate leads to a situation in which the management of *potential* risk in fact becomes not only a technical and scientific issue but also a social management task [6,7]. Although the form of technology may be described as scientific, to the extent that it is constructed by humans [8] within robust and powerful (though imperfect and sometimes uncertain) technical systems, it is applied to and for a social world. Therefore, the consequences that stem from the implementation of complex socio-technical systems evolve or indeed become *social issues*. The complexity of risks associated with technology therefore, do not stem from their specific technological components but are intimately linked and tied to their social and collective management. In this sense, complexity is also an intrinsic characteristic of the collective construction of risk, thereby implicated in its very meaning, structure and function.

Risks as complex technological phenomenon are presented here as an intrinsic characteristic of socio-technical systems, extending and uniting technological complexity to an emerging social complexity. Classical uncertainty, linked among other things to limitations in the technical knowledge of risks, becomes connected to the social uncertainty of socio-technical systems. Risk management therefore becomes seen as a socio-technical problem that incorporates elements of scientific uncertainty (potential risks) and also hypothetical (if not certain) social agents or stakeholders that operate, regulate and

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manage the technical system [3]. As a response to this situation the implementation of the precautionary principle becomes an insufficient or indeed an inadequate form of risk management [9–11]. This is due to its incapacity of guiding public action in terms of the socially constructed perception of risk. This is what we will conceptualise and therefore term ‘precautionary inadequacy’.

In terms of the present article, the sphere of telecommunications and more specifically mobile telephone infrastructure is taken to be our *social issue* operating in the paradigm of a *socio-technical* system. The spread of wireless communications has not only meant that there are now numerically more technological devices (mobile telephones) than users [12], but also that individuals have gained new capacities and the potential to personalise (be it ‘individualising’ [13] or ‘communitising’ [14–17] the use of this technology). These communicational activities have therefore led to the development of new types of relationships, with *oneself*, with *others* and with *one’s environment*. These developments however, more fundamentally are also exposing the scientific limitations of predicting and determining consequences associated with the intensive use of certain new technologies. The social response to the scientific uncertainty regarding the effects of the developments and implementation of this technology is linked to an acute and persistent perception of the associated risks [18,11]. It is in this context, that science becomes the nature and object of social debate as technology intervenes in everyday life generating dependence, independence and interdependence. Technological development might appear unquestionable, or at least inevitable, however it is in the sphere of *interdependence* where the establishment of technical measures for prevention, precaution and regulation need to be fostered accompanied by transparency and the participation of communities and individuals throughout decision-making processes [19].

This article highlights the case of the local management of mobile telephone infrastructures in Catalonia as an example of a socio-technical complex system linked to risk perception and the limitations of the precautionary principle in a scientifically uncertain context. The rapid deployment of infrastructure combined with uncertainties surrounding the health effects of electromagnetic fields has led to a situation characterised by doubt, controversy and conflicts between social actors [20]. Examining the controversy from a risk ‘governance’ framework [21–23], at the local level enables us to question the disciplinary narrow-mindedness of the traditional approach to risk management whilst also promoting the innovative practice of transdisciplinary approach to risk assessment [24]. This approach attempts to overcome the socio-technical obstacles that arise through the implementation of certain technological infrastructures, whilst encouraging the creation of some sort of social consensus in the previously uncharted areas of potential risks and scientific uncertainty.

## 2. ‘Precautionary inadequacy’ in the risk management of mobile telephone infrastructure

New information and communication technologies (ICTs) have played a central role in the conceptualisation of new risks and the social sensitivity and perception towards these [25]. In the context of our current technological development, a diagnosis of our societies as essentially ‘cautious’ is justified by a recognition of the effects of attempts to master technology and suppress or mitigate associated risks and dangers. In other words, contemporary societies, when faced with managing and controlling risk often resort to ‘quick’ and ‘friendly’ precautionary mechanisms in order to deal with possible and potentially technologically complex and/or uncertain consequences of implementation [26]. The axis of these ‘cautious societies’, as we shall see later, revolves mainly around the well known and debated precautionary principle.

As risks related to technologies are not only technical but depend on processes of social definition, the perceived risks related to mobile telephone infrastructure could well be characterised as ‘social problems’ [27]. This is due to the fact that risk manifests itself when the technological infrastructure becomes implemented within specific communities. Risks therefore cannot be conceptualised as ‘objective’ facts that exist independent of public opinion however are subjected and are indeed established by social communication processes [4]. Although the changes derived from the communications revolution have placed mobile telephones undeniably at the centre of people’s lives [12], some studies [18,11,20,28–31] have shown that the costs of these changes have not always been welcome. For example, in the specific case of risks associated with electromagnetic fields, despite societal transformations due to innovations in this field, the effects of this technology on public concern has been immense.

Technological societies are therefore experiencing contradictory dual trends in terms of generating a *shared universal* experience of risk whilst ironically at the same time *individualising* the responsibility of risk. The increasing possibility of a potential harm of technology that could possibly affect a large part of humanity (in terms of sudden or latent catastrophes) is presented as universal in terms of how these processes are eroding national, class or generational boundaries [32,33]. However, our experiences and daily lives are increasingly characterised by a process of technification with respect to production processes and the operations of institutions and everyday life in which *individual* action occurs. Spheres of action previously governed by tradition now constitute individual problems in terms of decision-making and responsibility [34,35].

There is in fact a growing broader public concern regarding different aspects of modern life, especially with regard to the benefits and consequences of science and technology [36]. It could therefore be assumed that risk has become an endemic element of societies comprised of complex endeavours, particularly those that introduce new (and until now unknown) technologies [37]. In a context of socio-technical complexity it is certain that once a new technology has been introduced there is *no* turning back. Ultimately the question therefore resolves around how to weave together the conditions in which living with risk can become consensually agreed.

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