6G4Society: Social Acceptance of 6G Technology

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***Abstract* — This paper presents the ongoing research activities of the 6G4SOCIETY project aiming to (i) understand the impact of 6G technology on society; (ii) propose models on the key values that shall underpin 6G technological development; and (iii) propose models and conditions to promote social acceptance of 6G technology. This work explores the social dimension of technology and its ecosystem, and considers the engagement of key stakeholders, also through the analysis of controversies to observe the complex interactions between science, technology, and society. This analysis can reveal public concerns and suggest appropriate communication strategies and techniques with specific target audiences.**

Keywords* — *5G, 6G, Social Acceptance, Acceptability, Awareness, Societal Values, Communication, Stakeholders Engagement

I. Introduction

The fifth generation of mobile communication networks (5G) was conceived to make a revolutionary change in the information and communication world, i.e. providing a unique and ubiquitous wireless platform to enable communication and data sharing among both human beings and technological devices with unparalleled performances. Despite these promises, and irrespective of a number of technical issues the technological development process may have encountered, 5G technology stands out for the social responses it has triggered, distinguishing itself for the low level of acceptance it activated. Opposition, rejection, and ban characterised the social response to this technology.

Public opposition towards opportunities or orientations of science and technologies has concerned in the past nuclear power, genetically modified organisms, genomics, cloning, embryo research, nanotechnology, opening the way to reflections on the importance of taking into account the relationship between technology and society earlier and earlier in the technological development process. It has become clear that the acceptance of innovation is not only determined by the technical features of an artefact or a product, or by its capacity to perform and solve a problem. On the contrary, it is related to the knotted interaction amongst variables and factors outside the lab: these are social factors, involving opinions, awareness, attitudes, behaviours and beliefs, all of which interact within the social environment shaping the acceptance or rejection of innovation.

II. 6G4Society: Exploring the Social Dimensions of Technology in 6G

This social dimension of technology, and the complex relationship between science and society has been studied in Science and Technology Studies (STS) and formalised at the policy level through the concept of Responsible Research and Innovation (RRI) [1]. It is through this outlook on technology that we can explore society with its desires, values, priorities, expectations, and gain awareness about any misalignment which would later reflect in a problem of acceptance [2].

The project *6G4Society*, that started in January 2024, is working to highlight some relevant threads that can make the difference in understanding social acceptance in the specific context of 6G technology.

Understanding the difference between "acceptance" and "acceptability" is key to adequately steer the development process of a technology at a conceptual phase.

A. Acceptability

Acceptability is the result of an assessment to evaluate whether and to which extent a technology aligns with a set of ethical values, recognised by a society and possibly codified within appropriate prescriptive instruments. Acceptability is therefore determined by the capacity to effectively translate such values into technical requirements and specifications in the design and development process. Ensuring that a technology is *acceptable*, bringing in it all the "must have" in terms of important ethics requirements responding to societal values (e.g., a technology that is sustainable from the environmental point of view; free from gender-biases at the level of design; accessible, etc.), certainly helps in favouring social acceptance, but may not be always sufficient, for the simple reason that we do not always or necessarily orient our preferences or behaviours towards things that are good for us, or devoid of negative consequences.

B. Acceptance

Acceptance, in turn, can be understood as the positive reaction (support, acceptance, adoption) of a group, or a society to a technological innovation. Acceptance derives from a positive perception about a technology, which may be independent from its intrinsic characteristics. Therefore, acceptance may exist also in lack of acceptability, and acceptability is not a guarantee to achieve social acceptance, although it can act as an important component of it. Also, while acceptability can be steered by transposing the normative level into technical requirements, acceptance eludes our capacity to be "*engineered*".

Acceptance cannot be "created"; however, we can look at the relationship between acceptability and acceptance in a given context, understanding to which extent these two concepts may overlap, which actors and elements fill this space, which dynamics are activated by their relationships, where possible frictions could arise, and what activate these frictions. Building a shared awareness amongst stakeholders about these dynamics is key. In 6G4society we consider awareness as the initial and essential step towards achieving acceptance. However, it is important to note that awareness

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alone does not guarantee the absence of resistance or neutrality.

This is why 6G4Society is also exploring the most important *controversies* that arose in the public narrative and perception of 5G and beyond 5G for what concerns implications and societal impact. The analysis of such controversies allows us to observe the complex interactions between science, technology, and society, including the political dimension, revealing issues of public concern (doubts, uncertainties, fears and misconceptions), or possible dissent within the scientific community. Also, understanding controversies is essential to fine-tune appropriate communication with specific target audiences.

The relationship between *societal values* and *acceptance* in the context of 6G is another key aspect that the project is addressing. While the work on Key Value Indicators (KVIs) and Key Sustainable Indicators (KSIs) is gaining importance in the 6G context [3], aligning definitions and methodologies becomes important, starting, for example, from an appropriate differentiation between the concept of "value" and that of "values".

To do that, 6G4Society will engage with key stakeholders and reach out to the general public, acting as a bridge between perspectives and ensuring that a correct representation of 6G impact is conveyed. In this session, key aspects resulting from our early reflections in the project will be shared.

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