

# Essays on Technology and Society

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## IMPACT PARAGRAPH

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*The impact paragraph of this doctoral dissertation is added in compliance with article 22.5 of the “Regulations for obtaining the doctoral degree at Maastricht University” decreed by resolution of the board of deans, dated 1 October 2020.*

The findings of this dissertation have important consequences for the debate regarding the development of sound policies in the context of digital transformation. As digital technologies become more and more ubiquitous and disrupt practically every field of human experience, solid policy action is of utmost necessity to address the challenges and tap the potential associated with the accelerated process of technological progress. The design and implementation of a coherent policy agenda depend on evidence-based analysis, which provides a robust foundation for the conception of policy interventions. In this context, this dissertation contributed to understanding the impacts of new technologies on human decision-making and attitudes in two domains.

First, it examined the impacts of algorithms on the job market. More precisely, Chapter 2 examined the effect of algorithmic advice on hiring decisions made by employers. In a world where algorithmic systems are being applied in various stages of the hiring process, understanding its effects in the labor market will continue to be of particular relevance in the coming years. Algorithms are now widely used for streamlining the screening of applications to job openings in online environments, and for recruiting and tracking employees’ performance in influential firms. Chapter 2 contributes to this body of research by analyzing – through a field experiment – if there is an observable difference in the assessment made by employers of jobseekers recommended by algorithms in comparison to their evaluation of candidates recommended by human choice. The study also examines if the previous attitudes of recruiters in relation to algorithms solutions and human decision-making affected the reactions to the recommendations provided by these two types of sources.

The primary finding of this chapter is that employers respond differently depending on their attitudes towards algorithmic and human advice in domains beyond the labor market. Contrary to common assumptions, I find that, when using algorithmic aids in hiring procedures, employers are not influenced by specific reservations on the capacity of an algorithm to select a candidate but rather by a general feeling towards algorithms in spheres other than the labor market. On one hand, decision makers with a general preference for algorithmic advice give significantly higher ratings if a candidate was recommended by an algorithm compared to when the candidate was

recommended by a human resource expert. On the other hand, decision makers with a general preference for human advice give significantly lower ratings to candidates recommended by algorithms when compared with candidates recommended by humans.

The findings of this paper shed light on an important, albeit overlooked, aspect regarding the widespread use of algorithm solutions in the labor market - the interaction between human perceptions and algorithms. As organizations rely increasingly on algorithms in hiring decisions, it is crucial to understand, correct and prevent difficulties related to algorithm aversion. While algorithmic governance becomes an ever more present reality, the findings of this paper indicate the relevance of policies aimed at optimizing the algorithm-human relationship. An important issue here is making investments in the enhancement of algorithmic literacy, geared to instruct decision - makers on the rationale of algorithm systems, their strengths, and their limitations. There still seems to be particularly low levels of knowledge regarding the use of algorithms in the labor market. Another conceivable policy solution involves design and implementation of more transparent algorithm solutions. Although transparency often comes as a trade-off with the algorithm's complexity and performance, the disclosure of algorithms into intelligible multistep procedures would afford more opportunities for alignment on human- algorithm decision processes and could be thus crucial for the effective use of algorithms.

Second, in Chapters 3 and 4 this dissertation contributed to one of the most controversial subjects in the public debate today: the role of technology and automated tools in the political arena of democratic systems. Over the last years, different accounts have described a strengthening of political segregation and partisanship in different countries and a radicalization of political discourse, associating this scenario to the massive diffusion of new technologies, particularly social media. According to this view, social media exposes individuals to a biased and imbalanced set of information, consolidating pre-existing political beliefs and enhancing hostility towards opposite ideas and figures. Furthermore, the exchange of information through social media would facilitate the diffusion of more extreme and intense messages than those encountered in physical interactions.

Despite the increased scholarly attention to the topic, empirical evidence on the effects of Internet and social media use on political polarization remains inconclusive. Empirical attempts to examine causal effects have been limited by identification challenges induced by self-reporting usage of Internet and social media – which typically result in biased outcomes. Many empirical studies document pure correlations, and are unable to make claims about causality. Moreover, most of the related studies have focused on the US context, and there is limited empirical evidence on other regions. The findings in these chapters suggest that contrary to what is suggested by the mainstream literature, internet and social media use may not be the cause of rising

political polarization across countries. Chapter 3 finds that political polarization in Brazil cannot be attributed to internet or social media use. Chapter 4 goes further and shows that that social media use attenuates rather than drives polarization, a finding that holds for different measures of social media use - dummy (yes vs. no), intensity (time spent) and frequency. Such findings attenuate the widespread concern that internet and social media use is a significant motive of political polarization in society nowadays.

From the perspective of design and implementation of public policies, these findings have significant impacts since they indicate that the efforts to reduce the polarization of political environments should be directed to other issues rather than the regulation of social media. Indeed, there are strong arguments that suggest that the enhancement of the political divide experienced recently by different democracies may have much deeper roots, like the rising economic inequality, rising trade exposure and the weakening of cross-cutting social identities.

Political polarization within deliberative democracies is a general trend reshaping the public spheres of several nations, as Chapter 3 has shown regarding Brazilian politics. Different indicators report an accentuation of the fissures in the political debate within numerous countries over the last decades. The problems and risks of this process of exacerbation of polarization are well-known. Excessive polarization may lead to widening political divides in such a dimension that makes compromises impossible, eroding the capacity of cooperation within society and undermining the effective functioning of political systems. Extreme polarization also has important nonpolitical impacts, affecting labor markets, immigration fluxes, and economic perspectives. Therefore, adequate comprehension of the causes underpinning the polarization process is vital for designing policies that may attenuate this trend. Chapters 3 and 4 of this dissertation shed light upon some overlooked aspects of the dynamics of social media and their effects on the political debate, helping to make a more accurate diagnosis of this complex phenomenon.

In recapitulation, this dissertation provides empirical evidence on the impacts of new technologies on human behavior, attitudes, and decision-making processes. Over the last decades, digital technologies have transformed almost every aspect of social life and human experience. Digital transformation has upended traditional industries at a remarkable speed, creating new products and services, designing groundbreaking business models, and engendering enormous economic value. The widespread dissemination of automated systems and algorithms allowed for massive efficiency gains and spurred a landscape of constant innovation. Social media caused structural changes in how people interact with each other and how societies communicate, bringing significant developments to markets and other domains, like the political debate within countries and the international relationships between nations. Overall, the find-

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ings in this dissertation may be of interest to researchers, policymakers, development practitioners, and the society at large.